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ABSTRACT

A review and evaluation were conducted of social science research that has been based upon the National Longitudinal Surveys (NLS) of Labor Market Experience. First, a comprehensive survey was undertaken of the labor market research that has used NLS data: (1) labor supply and the factors of female and male labor, child care and welfare, and marital instability; (2) labor demand and the effect of racial and sexual discrimination and unionization; (3) human capital and status attainment; (4) unemployment, job separation, and job search; (5) social psychological dimensions; (6) aging; and (7) research methodology. It was found during this review process that the NLS data neglected some significant areas such as promotions, supervisory responsibilities, job autonomy, and decision-making capabilities. Also overlooked were such factors as the impact of the Vietnam war on the younger male cohort and the inclusion of young males in the military in the original data samples. Suggestions were then offered for future research based on NLS data. Among these were included the substantive issues of the social forces affecting the family, the institutional constraints on the demand for labor, and the social demography of successive cohorts over time. (The references at the end of the report list all books and papers based on NLS data.) (EIG)

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RESEARCH USES OF THE NATIONAL LONGITUDINAL SURVEYS

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ABSTRACT

This report reviews and evaluates social science research that has been based upon the National Longitudinal Surveys of Labor Market Experience. We note underutilized areas of the surveys and offer suggestions for future research based on the NLS.

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I. INTRODUCTION

Our report on the research uses of the National Longitudinal Surveys of Labor Market Experience has several purposes. First, we provide a comprehensive survey of the research that has utilized the panel data on the four NLS cohorts.[1] Second, we compare the research done with the content of the surveys in order to identify neglected research opportunities. Third, we form judgments with respect to the direction of future research based on the NLS. Fourth, the information in this report may aid in the research design for surveys of two new youth cohorts and continuing surveys of the four existing cohorts.

In July of 1977 we began collecting published articles identified in the NLS Handbook and Newsletter. We also solicited published and unpublished papers in letters sent to all users of NLS data as identified from the Handbook, Newsletter, and from the Department of Labor's list of projects funded by the Office of Manpower Research and Development. In addition, Herbert S. Parnes provided us with published and unpublished papers by the staff of the Center for Human Resource Research (CHRR) at The Ohio State University.

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[1] The four cohorts are (1) younger men aged 14-24 in 1966; (2) older men aged 45-59 in 1966; (3) younger women aged 14-24 in 1968; and (3) mature women aged 30-44 in 1967. Respondents in each cohort will have been interviewed or surveyed by telephone in eight or nine of the years between 1966 and 1978. See The National Longitudinal Surveys Handbook (Center for Human Resource Research, The Ohio State University 1976) for further details. (Rather than reproduce material presented in the Handbook, we refer the reader less familiar with the NLS to that document.)

This report is organized around the major substantive areas of labor market research: labor supply; labor demand; human capital and status attainment; unemployment, job separation and job search; social psychological dimensions; aging; and research methodology. After surveying and evaluating NLS-based research in these areas, we present our judgments on neglected topics in the research and in the data, and conclude with our observations on future research utilizing the NLS data.[2]

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[2] Note that there are two lists of references for this report: citations to NLS-based research and citations to other publications.

II. LABOR SUPPLY

Fifteen years ago the determinants of male and female labor supply were thought to be well understood. For males, the secular decline in hours of work was seen as resulting from the income effects of rising wages dominating the substitution effects, thus causing the male labor supply curve to be backward bending (Lewis 1956).[3] For females, increasing labor force participation in the face of a rising standard of living was at first seen as an anomaly to economic theory suggesting that rising incomes would bring increasing demands for leisure. But this apparent anomaly was soon resolved by Mincer (1962) when he placed female labor supply in a family context and focused on both female wages and other family income as determinants of women's work decisions. Mincer shows that declines in the labor force participation of married women due to husbands' rising income (income effect) were more than offset by the positive female labor supply effects of rising wages for women (substitution effect).

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[3]The substitution effect is the change in the demand for leisure induced by a change in its cost (the wage rate), holding income (or utility) constant. A rise in wages increases the cost of leisure and thus induces hours of market work. The income effect is the wage-constant change in hours of leisure induced by a change in income. For "normal" goods, like leisure, incomes and quantities demanded move in the same direction. Thus the explanation for males is that income effects have swamped substitution effects, so that labor supplied is inversely related to own wage.

With Mincer's research came a sharper focus on the alternatives to wives working. Both leisure and housework were seen as her alternatives. This suggested that the home productivity of married women is directly related to family composition--the number and ages of children in the household. Cain (1966), and Bowen and Finegan (1969) not only confirm that the rise in female wages is the driving force behind the great increases in female labor force participation, but, just as importantly, they confirm that for married women, family composition plays an extremely important role in the decision to work. The presence of children, especially young children, was repeatedly found to have a large negative impact on the labor supply of married women.

A new theory of consumer behavior (Becker 1965; Lancaster 1966) talked of home production of commodities by home time, and market goods as the utility-creating process, rather than commodity bundles of income and leisure. Childcare is thus hypothesized to be a female time-intensive activity, especially when children are young. The well-established inverse relationship between number of children present and female labor supply suggested that the desired levels of both of these are joint outcomes of a common set of socioeconomic variables. In short, the fertility decision and the decision to work are interdependent. This insight has produced new research on fertility and its determinants (Schultz 1974).

In recent years there has been an explosion of labor supply research. The impetus came from many directions at once. The family model of labor supply allowed more rigorous testing of hypotheses. Continuing policy debates over income maintenance programs were behind much of the research.

The difficulties in interpreting the results of the temporary New Jersey and other income maintenance experiments have resulted in a greater concern for the issues of estimation and have highlighted some of the deficiencies of a family labor supply model that suppresses dynamic considerations (Greenberg 1972). The following issues have been raised by this flood of research:

1. The endogeneity of certain "independent" variables, such as assets (Fleisher, Parsons, and Porter 1971; Smith 1976), work experience (Mincer and Polachek 1974; Sandell and Shapiro 1975), and family composition (Schultz 1974)
2. The importance of jointness in wage-hours choices (Rosen 1976b)
3. Permanent vs. transitory changes in wages and income (Kalachek, Mellow, and Raines, forthcoming)
4. The process of human capital accumulation within the household (Benham 1974) and home investments in children (Leibowitz 1974; Hill and Stafford 1974; Fleisher 1977)
5. Efficient and unbiased estimation of the labor supply function itself (Heckman 1974b; Cogan 1975).

The research discussed below deals with some of these issues and presents different approaches. Since all of the studies use the Parnes data, they have the virtue of using the individual or the family as the unit of analysis rather than some larger aggregate (e.g., SMSA), which was characteristic of much of the research undertaken in the 1960s. Furthermore, the longitudinal nature of the data allows the investigator to examine labor supply in a life cycle context. Researchers usually measure labor supply by annual hours or weeks worked; the Parnes data permit measures of labor supply over longer time intervals.

Female Labor Supply and Fertility Expectations

Interest in female labor force participation over the life cycle has led to careful examination of women's work attachment in the interval between leaving school and first birth versus labor force attachment after the birth of a first child. Using as his measure of labor force participation the number of years in which the respondent worked at least six months of the year, Sandell (1977b) estimates separate labor supply functions for each of those periods for a sample of mothers, spouse present. He confirms that rising female wages have had a positive impact on married women's labor force participation, and like Mincer, shows that female labor force participation is greater, ceteris paribus, when husband's current income is temporarily below his permanent income, where the latter is proxied by husband's education. He also finds that in the post-birth period the substitution effect of wages on labor supply declines substantially when certain attitudinal variables and pre-child job experience are included as independent variables. Pre-child job experience, a favorable attitude toward mothers working, and a perceived favorable attitude of the husband toward the respondent's working all have positive effects on female labor supply. Sookon Kim (1972b) also finds evidence that permissive attitudes toward the propriety of mothers working have a significant effect on married women's labor force participation. Interpretation of attitudinal variables requires some care. Presumably, they represent an orientation toward the market. Considering them as "taste" variables cannot place the decision to work outside of an opportunity cost context. Thus either these variables capture differences in self-chosen home production functions or reflect rewards to working that cannot be captured by an own-wage variable alone.

Rosenberg (1972) uses the mature female sample to investigate the relationship between fertility, family composition, and labor force participation. He focuses on four family composition variables, besides the traditional wage and income variables, to predict current labor force participation probabilities: (1) age of mother; (2) age of mother at first birth; (3) number of children ever born; and (4) age of youngest child. All variables except wife's age have independent effects. The thrust of this research is that great increases in female labor force participation in the past have largely been due to changes in household composition with the independent effects of wage on participation playing a smaller role.

Wolfe (1977) analyzes both the NBER Thorndike-Hagen sample and the older male sample of the National Longitudinal Surveys to focus on the relationship between fertility, wife's education, and wages. While the higher opportunity cost of wife's time has a large and negative impact on family size, she shows that controlling for this and other factors, wife's education has a positive influence on number of children; she, like Michael (1973), attributes this to efficiency in consumption. Wolfe cautions that if employment opportunities constrict for the large numbers of well-educated women currently entering the labor force, the result could very well be a rise in the birth rate.

Shapiro and Mott (1977) focus on the likelihood of employment of young women who were out of school and had given birth to one or two children between 1968 and 1973. They estimate, separately for blacks and whites, the probability of employment for mothers in each of several

pre-birth and post-birth intervals as a function of a set of socioeconomic variables. While they choose to interpret their functions as labor force supply probabilities, they recognize that employment probabilities are smaller than labor force participation probabilities by the fraction of the population that is unemployed. Thus, as they note, their dependent variable is likely to pick up some demand influences. In any case, these estimates are something that only longitudinal or retrospective surveys are capable of providing.

For both races, in the pre-birth and post-birth intervals, the potential wage rate of the mother--which is data generated from an estimated equation that includes educational attainment, work experience, residential location and other explanatory variables--is positively related to her probability of employment. Over both intervals for whites, other family income is negatively related to women's probability of employment. For blacks, other family income is negatively related to the probability of employment in the pre-birth interval and positively though insignificantly related in the post-birth interval.

The relationship of a woman's education to her post-birth labor force participation has been an important research area recently, since it has been argued that a mother's home time is an important factor to a child's early human capital acquisition. Both Leibowitz (1974) and Hill and Stafford (1974) have shown that more highly educated women, a group that generally has greater labor force participation than their lesser educated counterparts, are more likely to withdraw from the labor force when their children are born. Such phenomena have important implications for the intergenerational transmission

of social mobility. Net of other factors, such as other family income and mother's potential wage rate, Mott and Shapiro confirm that, for whites, post-birth labor force withdrawal (low probability of employment) is positively related to wife's education. But the relationship is not confirmed for blacks, since education has a positive, though insignificant, effect on the probability of employment in the post-birth period.

The authors suggest that since these mothers are in their twenties, racial differences in the resources of the family's parents may be responsible for these differential rates of post-birth employment by education. These results are consistent with other findings that show that black women, especially highly educated black women, have greater labor force attachment than white women even after controlling for a variety of other factors. The authors also provide in this paper an analysis utilizing the longitudinal nature of the data and find that their cross-sectional estimates agree in substance with their panel estimates. A shorter, less sophisticated version of this research appears in Years for Decision, Volume 4.

Fleisher (1977) matches the surveys of mature women with those of the young men to create a mother-son sample, investigating the relationship between the mother's home time and education on the son's future educational attainment, intelligence, and early labor market success. His framework is a three-equation recursive model in which son's IQ, educational attainment, and wages are dependent variables, time-determined in the above order. While he finds little relationship between mother's home time and son's schooling, Fleisher believes that he has found evidence that mother's education interacts with her home time to produce greater

child quality as measured by either son's educational attainment or his wages in the labor market.

A great deal of recent research on the labor supply of married women and its relationship to fertility behavior has been done within the "Chicago" framework of family labor supply, or as it is called by its practitioners, "the new home economics" (Schultz 1974). The model shows the interrelationship between the demand for children (who are viewed as consumer durables) and the demand for market goods. In its most sophisticated form the commodity, "children," is taken to have two dimensions, quality and quantity, and household purchases occur up to both margins (Becker and Lewis 1973; DeTray 1973; Willis 1973).

Of the papers using the Parnes data, the one that is most faithful to this approach is Fleisher and Rhodes' "A Multiple Equation Family Model" (1977). Their model consists of four simultaneous equations in which the dependent variables are wife's wage rate, work experience, and number and quality of children. Exogenous variables include husband and wife's education, her age, race, and his wage rate at age 40 (estimated from a regression of a set of instrumental variables). For their measure of the wife's opportunity cost of her time, Fleisher and Rhodes choose the median wages of the occupation in which she worked the longest. To index child quality they use the child's wages as gleened from the young men or young women surveys.

The authors estimate the model in both linear and log-linear forms and find that the linear model is the preferred specification. Many of their results are similar to conclusions that have been reached using

simpler approaches: Being black hurts one's wages; schooling pays a positive gross return; an increase in wife's earning power reduces the demand for quantity of children. One curious result is that husband's wage is strongly and directly related to wife's wage. The authors posit a job-search theoretical explanation for this, but alternatives include shared human capital, marriage selection, or a within family "old boy" network. Their most surprising result is a positive influence of number of children on the labor force participation of married women. While we are uncertain of the robustness of the results, this paper represents a first foray into simultaneous structural estimates of fertility and female labor force participation behavior, using National Longitudinal Survey data.[4]

Kniesner (1976) is interested in a single parameter of the family labor supply model: the cross-substitution effect between one's hours of work and spouse's wage rate. In the past, most estimates of the income effect on married women's hours of work supplied have been based on the coefficient of other family income (mostly husband's income). This presumes that husband's earnings are a given; that his wage has no effect on the supply of her labor, nor does her wage have any effect on the allocation of his time between the household and the market. Using data from the first interview of the older men and mature women, Kniesner finds evidence that own hours of work and spouse's wage rate are positively related. Hence, for this sample, hours of market work of each spouse are also positively related and thus own time is complementary with spouse's time. It is obvious that this relationship is unlikely to be uniform over the life cycle. We need other stage-of-life estimates of the cross-substitution effect. Not only would they be valuable in and of themselves, but they

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[4]See Cain and Dooley (1976) for simultaneous equation estimates of wages, labor supply, and fertility, based on 1970 Census data.

are important parameters for public policy issues, since total labor supply effects must be known in order to estimate the costs of income maintenance programs.

One limitation of the "Chicago" model of family labor supply is its static nature. As such, the wage rates of each spouse are formally taken to be exogenous. In practice, to overcome the suppression of dynamic considerations, a wage rate equation for each spouse is commonly estimated on the basis of his or her education and work history. But the causation between work histories and wages for women is a difficult one to decipher. Do women withdraw from the labor market because of the low expected wages from participation, or is low participation the cause of their low expected wages? This is the concern of both Mincer and Polachek (1974) and Sandell and Shapiro (1976). Each of these papers are reviewed in our section on sex discrimination.

In another paper assessing the direction of this causation, Sandell and Shapiro (1977) suggest it is likely that the cohort of young women surveyed substantially underestimate their future labor force attachment. Much of their conclusion is based on the responses of the young women cohort to whether they expected to be working at age 35. They show, for all race-education categories, that when surveyed in 1968, the young females' expected labor force participation rates at age 35 were well below those participation rates that were currently experienced by women 35 years old in the mature women sample. Economic theory suggests that those women who expect to have greater labor force attachment will have steeper wage-experience profiles with a smaller constant term than those who do not because of the greater incentive to invest in on-the-job training. By using the survey response to expected labor force participation at 35 as an interaction term, Sandell and Shapiro estimate human capital wage functions for the young women and

find that their results are consistent with their derivations from economic theory. Their test is also interpreted as validating the survey instrument. However, one could argue that there is an inherent trade-off between validation of a theory and validation of an instrument; a single empirical test cannot do both. Finally, the authors present evidence from later surveys that young women seem to be adjusting upward their labor force participation expectations. This is not exclusively an artifact of the aging of that cohort. High school seniors in 1973 and college seniors in 1973, for example, expected larger rates of participation at age 35 than did their counterparts in 1971 or 1968.

A completely different style of research is one that investigates the determinants of expected fertility, expected future labor force participation, and the possible interrelationships between the two. Surveys of expected fertility are important because, in the aggregate, they can be an indicator of future population growth. Understanding the determinants of expected fertility sharpens those projections and allows policy makers in areas as diverse as labor, education, family counseling, and macroeconomics to assess the fertility impact of their policy choices.

The NLS young women data and other survey data have shown that female respondents, when asked about their expected fertility (FF) and what size of family they consider ideal for America (IFS), have revised their estimates downward during the 1970s. Suter and Waite (1975) compare the 1971 and 1973 expected fertility responses and relate each to a set of socioeconomic status variables as well as ideal family size, a sex role attitude measure and a change in financial status variable. They find that the bulk of the decline in expected fertility can be explained by downward adjustments in the

size of an American family that respondents consider ideal, rather than changing sex role attitudes or financial status (better, same, worse) relative to the previous year. The authors can only speculate as to the reasons behind the downward adjustment in ideal family size that took place between 1971 and 1973. Possible candidates not captured by their sex role attitude variable show increased concern about population and the environment, perceive slower rates of future economic growth, experience more fierce than expected competition for career jobs among males in the baby-boom cohort, as well as the changing role of women in American society.

In separate OLS regressions using the 1971 young women data, Shortlidge and Kohen (1975) explain expected fertility and ideal family size on the basis of a set of variables that includes parental family background measures, measures of respondents' labor force attachment, and measures of exposure to family responsibilities. By restricting their sample to those out of school, they were able to include labor market variables such as experience and atypicality of occupation. All measures of labor force attachment, past, present as well as future, parental family background, and educational attainment are significantly inversely related to expected fertility, though little of the variance in this measure is explained. Not surprisingly, the determinants of expected fertility and ideal fertility are much the same, indicating perhaps that most women do not perceive themselves as deviants in relation to the (self-perceived) American dream.

Waite and Stolzenberg (1976) focus their attention on the relationship between expected fertility and future labor force participation plans (LFPP). They argue that while each affects the other, each is also

partially determined by other variables, but not the same set of other variables. Using 2SLS, they estimate $\hat{LFPP} = f_1(FE, X_1)$ and $\hat{FE} = f_2(LFPP, X_2)$, where X_1 and X_2 are sets of variables that do not completely overlap. They conclude that expected fertility has a smaller net effect on labor force participation plans than the latter has on the former.

In another paper, Stolzenberg and Waite (forthcoming) examine the partial effect of labor force participation plans on expected fertility for the young women's sample, stratified by age (A). Not only is $\frac{\partial FE}{\partial LFPP}$ negative, but so is $\frac{\partial}{\partial A}\left(\frac{\partial FE}{\partial LFPP}\right)$. To the authors, this suggests that older respondents have a more realistic vision of the costs of children as they have acquired more and better information about the labor market and household productivity. Whether this negative cross-partial suggests that women are more realistic as they age (the learning hypothesis), or whether it is older women who consider it more likely that at age 35 they will have pre-school children to inhibit their labor force participation, is difficult to say. The authors' test to distinguish between these hypotheses is not compelling.

Knowing the determinants of fertility expectations is important for policy purposes, but finding them can be a tricky business. At issue is the ever-present problem in social science research of distinguishing between correlation and causality. All of the researchers above see plans for future labor force participation (LFPP) and certain attitudinal measures as causes of differential fertility expectations among young women. LFPP is a dummy measure of respondents' answers to this question: "What kind of work would you like to be doing when you are 35 years old?" where the possible responses are:

a. married, keeping house, raising family;

b. same as present (last) job;

c. don't know.

This point-in-future-time estimate of labor force participation is unlikely to capture a woman's labor force attachment. These might have been better questions:

1. During your 30s do you expect to work at least some of each year?

2. In how many of those years do you expect to be working full time?

One commonly used attitude measure is the respondent's three-part response to this question:

> Now I'd like you to think about a family where there is a mother, a father who works full time, and several children under school age. A trusted relative who can care for the children lives nearby. In this family situation, how do you feel about the mother taking a full-time job outside the home?
>
> a. If it is absolutely necessary to make ends meet?
>
> b. If she wants to work and her husband agrees?
>
> c. If she prefers to work but her husband doesn't particularly like it.

The respondents reported whether they felt that it was definitely alright, probably alright, probably not alright, definitely not alright, or no opinion. Other attitudinal measures used at times were wife's perceptions of husband's attitudes toward women working, and a nine question survey of attitudes about the desirability of wives working.

Whether these questions capture differences in unobservable "taste" variables that are causally related to expected fertility is a difficult question. We suspect that one's answers vary according to one's discipline. What seems to be missing as possible determinants of expected fertility are

the traditional economic variables of wages and income. Education is a poor proxy for female opportunity costs of market work since it explains so little of the variance in women's wages. For married respondents, husband's income is available and is used as a determinant in one of the papers. But that variable is likely to be a poor proxy for permanent family income since husbands are likely to be in that age interval where their age-income profiles by education (human capital acquisition) are likely to be crossing. Median earnings of husband's occupation seems like a better candidate.

Child Care and Welfare

Richard L. Shortlidge and Patricia Brito (1977) analyze how working women with children under 14 deal with child care responsibilities. As their data base, they use the 1971 mature female sample and the 1971 young female sample. Both contain responses to an extensive child care questionnaire administered that year. Much of their analysis consists of cross-tabulations that highlight the use of various forms of child care (family, nonfamily, inside home, outside home) by age of children, wage rate and hours worked of mother, mother's education, and other variables. In addition, with the use of multiple classification analysis, they relate the use of family or nonfamily day care to household composition, job characteristics of working mothers, personal characteristics and geographic location. Their most interesting result is that both women's earnings and their education are positively related to use of nonfamily child care after controlling for other factors such as household composition and availability of relatives in the

community of residence. They also provide estimates of the cost of child care per hour worked of the mother. Cost outlays averaged 37¢/hour worked for children 0-3, 27¢/hour for children 3-5, or between 15 and 20% of working women's wages. For children of school age the cost was much smaller.

This study provides valuable information on what consumption bundles working women choose, but it is unable to overcome the simultaneity of supply and demand in order to disentangle the determinants of that choice. The restriction of the sample to working women gives us no estimates of how the presence of children form barriers to labor market entry for nonworking women (but see Heckman 1974a, 1974b, 1976).

In a related study, Shortlidge, Waite, and Suter (1975) compare the 1971 NLS mature female survey of child care arrangements with a 1965 CPS survey (Low and Spindler 1968). They document the still small but increasing reliance of working women on group day care centers for their children, as within-home substitutes become increasingly unavailable or prohibitively expensive. The greatest increase in utilization of group centers comes from nonwhite women with pre-school children, and this is most likely due to federal programs aimed at that population. The authors also discuss increased suburbanization, increased female labor force participation, and changes in the female occupational structure as factors responsible for the secular change in child care arrangements.

While Shortlidge and his co-authors have documented the kinds of child care used among employed women, Heckman (1974a) is interested in the labor supply effects of programs that lower the cost of formal child care arrangements: In particular, under what conditions will currently nonworking mothers work? Will working mothers work more hours? Or for most mothers

will there be no effect on hours of work, as informal sources such as older siblings or relatives continue to be used?

To answer these questions Heckman argues that he needs to know three things: (1) What determines the cost of children? (2) What determines the wages women require to work in the market place? (3) What determines the marginal rate of substitution between income and leisure, i.e., market work and home production? Knowing the determinants of these three allows Heckman to estimate the impact of work-related child care subsidies on labor supply.

Heckman uses the 1967 mature female sample, restricting his analysis to spouse present, for those families with at least one child under 10. For both blacks and whites he finds that child care costs are inversely related to the presence of a relative or older sibling in the home and length of residence for those living within an SMSA, and positively related to husband's hours of work and residence location within an SMSA. To estimate the asking wage function, Heckman relies on a statistical procedure that he developed for a previous paper (1974b). This procedure allows use of the entire sample of working and nonworking women (both groups were asked about child care) rather than estimating the determinants of the wages for which working women are willing to work. The latter procedure, common until Heckman's 1974 paper, is vulnerable to sample selection bias. For both blacks and whites, their asking wages are positively related to their years of education and labor market experience.

To estimate the marginal rate of substitution, Heckman relies on the same procedure to yield estimates of the slope of an indifference curve up to a second order approximation. The estimated slope or marginal rate of substitution is a function of the number and ages of children present

(categorized 0-3, 4-6, 7-10) as well as wife's education, income, assets, and current hours of work.

A complete summary of Heckman's estimates of the labor supply effects of child care payments that are tied to work is beyond the scope of this paper. In fact, the results seem subordinate to the innovative approach to the direct measurement of the slope of an indifference curve and the statistical procedure employed to take advantage of the data on child care preferences of nonworking women. Nevertheless, Heckman does find cases in which child care subsidy offers tied to work would have positive labor supply effects and reduce net government welfare costs.

Two other studies of welfare and female labor supply are by Meyer (1975) and Shea (1973). Both use the 1967 mature female survey to examine the relationship between welfare benefits and the willingness to work, but their approaches differ. Choosing as his sample working women who would have been eligible for assistance under the now defunct Family Assistance Plan (FAP), Meyer estimates labor supply functions for black and white women. For both groups he finds that net wages (net of foregone FAP benefits) have no significant effect on hours of work, as income and substitution effects seem to balance out. Instead, respondent's education and job experience, self-reported health status, and the presence or absence of pre-school children are the major determinants of annual hours of work supplied.

Shea takes as his sample women out of the labor force. All were asked whether they would accept a job if it were in their area, and respondents who indicated interest were asked a series of questions, one of which was their wage requirement. Responses were consistent with the women's past labor force participation. Those who had greater previous market experience were most willing to return to work if a job was available. Using multiple regression

analysis, Shea analyzes the determinants of the willingness to accept the hypothetical offer and for those interested, the determinants of their asking wage. His results indicate that current receipt of welfare benefits slightly lowered the propensity to work for whites and raised the asking wage less than 25¢ for both groups.

Though FAP is dead, Carter's welfare proposals are on the table and the relation between labor supply and public assistance, well-studied in the past, is likely to continue to be a research issue for many years to come.

Rosen (1976a, 1976b) is also interested in labor supply at the wage margin. Since married females are likely to be secondary earners, their first dollar earned is taxed at the same marginal rate as their spouse's last dollar. Using the 1967 mature female survey data, Rosen tests a model that estimates the tax perception for white wives. Consistent with his derivations from economic theory, his results indicate that labor supply is responsive to net wages rather than gross wages.

Marital Instability

A utility maximizing approach to understanding the social behavior of the individual over his/her entire life-cycle seems to be the ultimate goal of the "new home economics." Becker (1973, 1974) has used this principle to develop a theory of marriage in terms of the expected costs and benefits to each party of such a union. The new home economics takes the union as given to predict the demand for children and the allocation of time to household and market work on the basis of nonlabor income and each spouse's household and market productivities. A complete well-integrated theory of family formation and the allocation of time to investment, home and

market activities is far from sight at this stage. Nevertheless, it is not surprising, then, that economists have recently begun to bring their expertise to the subject of divorce and separation.

Research in this vein using the NLS data are papers and a dissertation by Cherlin (1976a, 1976b, 1977), and a paper by Kniesner (1976). Using the mature women data, Cherlin chooses white nonfarm women 30-44 with husband present in 1967 as his sample. To investigate the determinants of marital instability, he relates a dummy dependent variable for divorce or separation during the 1967-1971 period to a set of independent variables. The independent variables include length of marriage, actual or expected wage of the wife relative to that of the husband, number of children under 18, a dummy for any children under 6, size of residence, educational attainment measures, and measures of age differences between spouses. Using OLS and logit analyses (the latter in his dissertation) Cherlin finds a number of factors that influence marital instability. Among his conclusions are that wife's relative wage, number of children, and large age differences between spouses are positively related to divorce or separation, while the presence of young children is negatively related to marital instability.

In a similar analysis that also uses the mature women surveys, Kniesner (1976) finds that, ceteris paribus, families with many children and low levels of assets are more likely to experience divorce or separation. He also fails to detect an independent effect of race on marital dissolution.

The above research suggests that the relationship between the probability of marital instability and children is a complex one. The presence of young children does seem to delay and perhaps inhibit divorce or separation. Becker, Landes, and Michael (1977) report similar findings in their analysis

of SEO data. They also note that while families with more children may experience divorce or separation more frequently than families with fewer children, it does not follow that families with no children have lower divorce rates than families with children. Indeed, they do not. Furthermore, they show that the relationships of the number, presence, and ages of children to marital dissolution probabilities change with the length of marriage. Thus the NLS-based analyses of marital instability by Cherlin and Kniesner should be interpreted with caution. Their analyses are confined to the older female cohort, and as such tell us at most only the determinants of marital dissolution for women in their thirties or middle forties who had a spouse present at some time during this period.

Bahr (undated, a) looks at some determinants of marital instability for all four samples. In this paper Bahr finds that net assets have a significantly positive effect on marital stability in all four samples. In another paper (undated, b) that analyzes only the young women sample, Bahr finds that the importance of assets differs according to when the union was formed. He finds that for those who married in their teens, net assets' positive influence on marital stability was absent. Unlike Kniesner, he finds significant racial differentials in the probability of marriage dissolution. A major deficiency in both of Bahr's papers, though, is a lack of attention to other variables that may be causally related to marital instability, in particular, family composition and female wages.

As the above summary shows, the potential for understanding women's allocation of time between household and market activities had been richly exploited using the NLS data. If we may offer a single criticism it is

that there has been an excess of attention to the labor allocation of married women to the neglect of the social forces that operate on single women. In this respect we are unaware of any research using the NLS data that has as its aim predicting marriage formation on the basis of Becker's or any other theory of marriage, though it is possible that such research is currently underway. Furthermore, while in this section we have not really dealt with the determinants of educational attainment and instead leave that topic to other sections below, we feel that the post-secondary educational attainment of women is an aspect of life-cycle behavior that is still only vaguely understood. Research that delineates the multiple motivations behind such educational acquisition should be part of the social science agenda of the 1980s.

Male Labor Supply

Compared to the female cohorts, there has been much less research using the NLS data to understand the determinants of male labor supply. This is possibly due to the fact that the two male cohorts are at opposite ends of the life cycle, while prime age males are largely unsampled. Hence most investigators of male labor supply may have chosen other data sets that cover the entire adult life-cycle, if only cross-sectionally, for their empirical work. On the other hand, one reason why the older and younger NLS male cohorts were sampled is precisely because their labor supply is variable--as they enter and leave the typical male span of full-time participation. Thus the dearth of labor supply research using the male NLS samples is disappointing. Some of the problems typically encountered in using the NLS data, discussed briefly at the end of this report, may be particularly acute in the analysis of male labor supply. For whatever reasons, most male labor supply research that has been done is concentrated almost exclusively on the older cohort.

Both Fleisher and Porter (1970) and Egge (1973) use the early older male surveys to illuminate the determinants of labor force participation and annual hours worked for this cohort. Both use the traditional cross-sectional methodology to assess the importance of factors that influence labor supply. Fleisher and Porter find that the labor supply of this cohort differs considerably by race, marital status and self-reported health status. Their concern is also with the impact of past unemployment experience on current labor force participation. In general their results often contradicted standard economic theory, possibly indicating serious misspecification, and their analysis was handicapped by an insufficiency of observations that would have permitted a high degree of disaggregation. It seems likely that this research provided the stimulus for the more dynamic approach to labor supply that the authors take in a later inquiry (see below).

Egge is interested in explaining why whites in the older male cohort work about 200 hours more than blacks. He finds that this differential is much more influenced by age, wage and unemployment differentials than by racial differences in marital status, health status, or occupation.

Dissatisfaction with the cross-sectional approach to labor supply has led to the exploitation of the longitudinal nature of the NLS data. In addition, that dissatisfaction has led to new theoretical approaches to the hours of work decision. For example, the impact of "other income," whether it be spouse's earnings, government supplements, or income flows from nonhuman owned assets on labor supply has been viewed recently from a new perspective. This view maintains that nonhuman assets are not strictly exogenous to labor supply, as is supposed in cross-sectional estimates of the income effect of nonemployment income on labor supply (Smith 1976). Instead, the level of (net) assets can be viewed as a choice variable itself and hours of work may respond to bring actual assets into greater conformity with desired asset levels. This

is the thrust of the paper by Fleisher, Parsons and Porter (1971). They use 1966 and 1967 data on the older male cohort to test an asset disequilibrium model of labor supply. This sample seems well-chosen for a test of the model, since older workers' current labor force behavior is likely to be affected by imminent institutional barriers to their own labor supply (i.e., mandatory retirement policies and government disincentives), and these workers must be conscious of financing future consumption from non-employment income flows. The authors hypothesize that if actual asset levels are below (above) desired levels, a positive (negative) effect on hours of work and earnings in the next period will result, and thus dampen asset disequilibrium. They estimate an equation for desired net asset holdings as a function of age, race, education, occupation, whether any parents are living, and other variables. Several variants of their model suggest that as much as 50 percent of the asset disequilibrium is removed through an hours of work response in the next year.

This study was undertaken with a particular eye toward understanding the labor supply response to the recent income maintenance experiments. Fleisher, Porter and Parsons thus present an analysis that argues that the labor supply declines observed during a temporary income maintenance program not only understate the long run response to that program but also understate the labor supply withdrawal that would occur if the income maintenance program were a permanent feature of our tax system.

Kalachek, Raines and Larson (1977) are also concerned that cross-sectional estimates of labor supply fail to give us insights into the speed of adjustment to changes in explanatory variables, some of which may be variables amenable to manipulation through social policy. They question the assumption underlying cross-sectional estimation that the labor supply response of a household to a change in an exogenous variable is the same as the difference in

the labor supply of two households that differ only in the level of this explanatory variable. Hence they offer and test several models of dynamic labor supply adjustment. They utilize the panel nature of the NLS data by taking as dependent variables the changes in older male labor supply between both 1966 and 1969, and 1969 and 1973. In addition, they partition wages into a permanent and transitory component and measure each through the use of a predictor equation of instrumental variables. While their paper is still in preliminary form, it is valuable in and of itself since it breaks with the long tradition of cross-sectional estimation. However, their tentative conclusions are that a dynamic labor supply adjustment model gives estimates that are consistent in sign though at times of smaller magnitude than a cross-sectional methodology.

Kalachek, Mellow, and Raines (forthcoming) provide most of the theoretical underpinnings of the paper above. Their paper contains a good discussion of the appropriate specification of the labor supply function and compares parameter estimates when various dependent variables and wages specifications are chosen. They also feel that their profession has overemphasized the wage parameter in the labor supply function and slighted the importance of attitudinal, demographic and health variables in explaining variation in labor supply.

III. LABOR DEMAND

Survey data on the socioeconomic attributes of individuals seem ideally suited for research on labor supply, labor force participation, and human capital or status attainment models of individual socioeconomic success. As we have seen, the NLS data have provided the basis for considerable "normal science" research in those areas. In recent years, however, the appropriate representation of "demand" or "structural" determinants of social process have been debated by social scientists. "Dual" and "segmented" labor market theories have offered explanations of socioeconomic inequality which focus upon institutional barriers to neoclassical market mechanisms (Doeringer and Piore 1971; Edwards, Reich, and Gordon 1975; Thurow 1975). Radical and Marxian theories have introduced interest group conflict, class domination, and exploitation into models of socioeconomic inequality (Gordon 1972; Bowles and Gintis 1975; Bonacich 1977; Wright and Perrone 1977). These approaches often stress the importance of attributes of jobs and their hierarchical arrangement in the occupational structure. Direct tests of many aspects of these theories requires data not attainable from representative social surveys of individuals: e.g., attributes of industries, the social and technical organization of work, and actions of employers. However, micro-survey data have been used to indirectly test hypotheses derived from these theories, and occasionally such data have been combined imaginatively with other sources of information (e.g., published characteristics of firms or industries) to obtain more direct tests.

For example, according to dual labor market theory, women and minority groups are often confined to the "secondary" job sector, where workers obtain

lower wages, have less opportunity for career advancement, and receive lower returns to their productive capabilities. The resulting discrimination against disadvantaged groups is typically assessed with micro data by decomposing group differences in socioeconomic success into three components: a portion due to differential individual human capital endowments and other predetermined personal characteristics, a portion due to discrimination from differential returns to those characteristics, and a residual differential representing direct discrimination. (Of course, the same procedure is also used to assess group disadvantages within a neoclassical model incorporating employer or employee "tastes" for discrimination.) Directly stratifying a sample of individuals into labor market sectors on the basis of occupation or industry can provide a somewhat more direct test of dual or segmented hypotheses.[5] Both strategies have been employed with NLS data. Finally, of course, intergenerational and intragenerational occupational immobility predicted by "demand" or "structural" hypotheses can be directly tested with micro-survey data.

Dual and Segmented Labor Markets

Andrisani (1973), in a dissertation based upon the NLS, examines the degree to which socioeconomic origins, investments in human capital, worker attitudes, and environmental "demand" characteristics determine mobility between job sectors and the wages of young black and white men in each sector. Jobs of individuals are defined as primary or secondary according to the median income of males in 1960 census three-digit

[5] However, see Cain (1976:1245-47) for a discussion of the potential biases that can result when a sample is stratified on an endogenous variable. A further problem is that there is virtually no consensus on how to operationalize labor market sector.

occupation and industry categories. Andrisani reports considerable mobility out of first jobs in the secondary sector and into intermediate or primary 1968 jobs for both black and white young men. Thus, he concludes that career origins in the secondary sector do not provide an impenetrable barrier to early labor market advancement. Representing the likelihood of a primary first job with a linear probability model, he finds that years of schooling differentiates whites who start their careers in the primary sector from those who do not. However, more schooling does not appear to allow young black men to avoid secondary first jobs. Andrisani finds measured ability affects the probability of a primary first job for blacks but not for whites, and he suggests that this may simply reflect the lower association between schooling and ability among blacks. More advantaged socioeconomic origins have a net effect of obtaining a primary first job for whites but not blacks. (Unfortunately, reduced form estimates are not reported. This precludes assessing whether the <u>total</u> effects social origins, including that part transmitted by education, substantially affect the first job sector of either group.) Thus, black males appear doubly disadvantaged. Overall, they are more likely to enter the labor force in secondary jobs, and neither advantages of schooling nor social origins increase the likelihood of entering primary first jobs.

Andrisani also estimates a linear probability model of the likelihood of a primary 1968 job for those with secondary first jobs. Human capital variables had no effect on the probability of secondary to primary mobility for either whites or blacks. Overall, according to Andrisani, motivations and discrimination are considerably more

important than investment in human capital in determining or inhibiting secondary to primary mobility among young males.

Andrisani's wage rate regressions show that, as predicted by dual labor market theory, human capital variables account for little variation in the wage rates of those with secondary sector jobs in 1968. Indeed, wage rates of secondary sector blacks are virtually unrelated to schooling, training, and first job status, while primary sector blacks obtain returns to schooling and first job status that exceed those of primary sector whites (note: the latter interpretation is our own; Andrisani discusses only statistical significance, not the magnitude of coefficients). Perhaps the most interesting aspect of the dissertation is the interactions of labor market sector by race. If similar results are obtained with larger samples (many of his regressions are based upon less than 100 cases) and replicated on older cohorts, we will better understand the mechanisms that produce racial discrimination in the labor market.

In another report based upon a dissertation, Buchele(1976) uses 1967 data on NLS older white males to test hypotheses implied by labor market segmentation theory. He examines the manner in which job characteristics provide an "institutional context" to the relationship of personal traits to labor market outcomes. From Dictionary of Occupational Titles characteristics matched to three-digit Census codes, he defines five "occupational classes" (professional, supervisory, craft, subordinate, and menial) according to the complexity and autonomy of each. Five "industry classes" (core, periphery, producer services, consumer services, and government) are defined according to technical functions of the

industry and, for core and periphery classes, according to a factor analysis of industry traits such as capital/labor ratio, establishment size, profits, unionization, employment growth, and government purchases. His first analysis of NLS older males (white, not self-employed) examines whether the 25 occupation-by-industry class categories have a significant additive effect on 10 labor market outcomes of individuals (including earnings, intrinsic rewards, company training, unemployment, layoffs, quits, and job tenure), controlling for individual human capital and other traits (e.g., schooling, other training, experience, health, marital status, father's occupational status). He then examines whether the industry-occupation differences that exist after controlling personal traits are consistent with the implications of segmented labor market theory. He finds that among these older white males, unemployment, nonparticipation, job tenure, job turnover, and the likelihood of layoff and quitting are all substantially higher in the periphery sector (relative to the core sector). He finds that industry class differences matter much less for earnings and intrinsic reward differentials (although significant occupation class differentials are detected). His second analysis is an elaborate interaction model, where the relationship between labor outcomes and both personal traits and "circumstances of employment" (region, union contract, regional unemployment rate, etc.) are allowed to vary within each of the five occupation classes. These results are less conclusive, since the interactions use many degrees of freedom given the limited number of observations. He does seem to find, as Andrisani and others have found, lower returns to human capital investments in "secondary" jobs. His policy conclusion drawn from these results is that economic development--the elimination of "bad jobs"--

will do more to reduce inequities in labor market outcomes than will remedial manpower programs aimed at increasing the human capital investments of the disadvantaged.

Perhaps the most creative aspect of Buchele's work is in combining the DOT information on occupations, the industrial measures, and the NLS micro data on individuals. As noted above, very few social surveys of individuals contain detailed information of the technical and social relationships within the work place of a person's job, and consequently an imaginative merging of data from several sources is often necessary to examine (albeit rather indirectly) empirical implications of dual and segmented labor market theories.

Leigh's "indirect test" (1976b) of dual labor market hypotheses makes no attempt to identify primary and secondary sectors. Rather he examines racial differentials in occupational advancement that result from inter-firm and inter-industry job shifts, controlling for individual endowments in human capital. If blacks are disproportionately confined to the secondary sector, and if the secondary sector is characterized by low paying jobs and little opportunity for promotion, then, ceteris paribus, blacks should receive lower returns (in occupational upgrading) from inter-firm and inter-industry job shifts. In addition, blacks who remain within a firm or industry should experience less upgrading than do whites with comparable personal characteristics. (A job shift is defined as a change in three-digit census code, and upgrading versus downgrading is evaluated with respect to the median earnings of males in each category.) Leigh's analysis of job shifts from 1966 to 1969 for both younger and older NLS men (and

comparable analyses of 1965 to 1970 shifts measured in the 1970 Census), show that blacks were not disadvantaged with respect to occupational upgrading in the late 1960s, but he cautions that the momentum for those gains may be attributable to the relatively large racial differential in occupational standing at the start of the period.

In another article, Leigh (1976a) examines the degree to which occupational advancement mediates the (hourly) earnings returns to human capital investments for NLS mature men. His analysis appears to show that the economic disadvantages of blacks are largely attributable to discrimination in the process of occupational advancement. This aspect of the analysis seems to rely upon internal labor markets for an explanation. However, Leigh interprets the lack of any industry effects in his occupational advancement equation as inconsistent with implications of dual labor market theory.

Kalleberg and Hudis (1977) use shift in three-digit occupation and/or employer between 1966 and 1971 to define four labor market "structures" for NLS older men. By including 1966 wage among predetermined variables in a regression for 1971 wages, they interpret returns to other variables as effects upon "wage gain" from 1966 to 1971. They examine the effects of labor market structure (occupation/employer shift), "job variables" (region, regional labor market size, regional unemployment rate, specific vocational preparation rating of job, and public versus private employment), and human capital resources on 1971 wages, net of 1966 wages. As other research with these data have shown, labor market segments and race interact in determining economic advancement. "Stayers," those who change neither occupation nor employer, obtain a larger return to their 1966 wage. The authors interpret this

as the effect of advancement through firm-specific and occupation-specific internal labor market ladders. Those who have undertaken voluntary shifts of both occupation and employer receive lower returns to their 1966 wage, and this effect is more pronounced for blacks. Finally, blacks who change occupations for a given employer receive virtually no net return to schooling or job tenure, while whites in similar labor market "structures" obtain substantial returns to both attributes. Thus, firm specific occupational advancement appears to reflect advancement through internal labor market promotion lines for whites but not for blacks, a result consistent with the proposition that blacks are concentrated in the secondary job sector.

Kalachek and Raines (1976) use 1966 and 1969 NLS data for older men to evaluate the relative contribution of human capital variables (e.g., education, training, experience), "carrier attributes" (e.g., health, age, marital status, race, socioeconomic origins, attitudes, geographic mobility), and "market differential" variables (e.g., region, occupation, industry, union) on wage differentials. They conclude from their log-linear wage regressions that human capital variables are the most important determinants of wage differences, though the return to investment in human capital is not independent of attributes of the "carrier" in whom investments are made. The impact of market segmentation appears in their results as modest effects of geographic location, urban location, and position in the occupational-industrial structure.

Birnbaum (1976) examines the implication of dual labor market theory that differential career origins provide unequal opportunities for on-the-job training and subsequent return to that training. He

classifies the first jobs of NLS older men into five "job sectors" according to the "level" and "breadth" of skills required. He suggests that there should be a net return to the skill level of career origin when incorporated into a conventional human capital equation for 1966 hourly earnings. He detects a return to skill level of career origins and concludes that "there is a chain-like interaction between formal education, particular career origins, and later job experience." Of course, this has been a central feature of status attainment representatives of socioeconomic outcomes for over a decade. In those models, education is predetermined with respect to status of first job, which in turn is predetermined with respect to later occupational and economic achievements. Indeed, these models suggest that Birnbaum could have gone further (apart from obtaining a better scaling of "breadth" and "level" of job skills) by examining how career origins mediate the economic return to schooling and how skill level of current job in turn mediates the influence of career origins on hourly earnings. Thus, the dual/segmented labor market research summarized here suggests a common ground for the elaboration of human capital, dual labor market, and status attainment models of economic success: the incorporation of more sophisticated notions of occupational and industrial skill levels and hierarchies.

Racial Discrimination in the Labor Market

Flanagan (1974b) examines job turnover as a possible dual labor market-type mechanism accounting for racial differences in economic success of young and mature males. According to this view (and

contrary to job search theory), job instability is characteristic of secondary market location, where job changing behavior is often neither motivated by nor results in an economic return. Flanagan computes a standard decomposition of the wage differential into a component due to differential job turnover and human capital endowments of black and white males (given the white wage structure), and the residual gap attributable to labor market discrimination. Regressions of 1967 (log) wage rate by race for the older cohort yield results inconsistent with the dual labor market hypothesis about job turnover--blacks actually receive a higher return to each employer change than do whites (while the mean number of changes is nearly identical for the two groups). However, there is not a positive return to employer change for young blacks. Flanagan suggests that, consistent with dual labor market theory, the shifts of young blacks are not economically motivated. As others have found, blacks obtain a substantially lower return to schooling than do whites in both cohorts (which, Flanagan suggests, rationalizes their lower investments), and the economic disadvantage of living in the South is greater for blacks. When broad occupational categories are controlled in the wage equations, the racial wage differential is reduced substantially, indicating that as much as 40 percent of the wage differential is mediated by occupational segregation.

The gross racial wage differential for older males reported by Flanagan is 42 percent, two-thirds of which is attributable to differential composition of blacks and whites on the predetermined variables (primarily years of schooling). For younger males, the gross differential is about 28 percent, three-fourths of which is due to racial

differences in predetermined characteristics. Overall, Flanagan concludes that "the single most important source of racial hourly wage differential is . . .the lower level of and return to black schooling investments," and "any labor market segments which may exist within an age group are not defined by differential turnover flows" (p. 529).

Hall and Kasten (1973) directly examine occupational aspects of racial differences in economic success. In the first part of the paper, they decompose the racial wage differential into components due to the different distribution of blacks and whites across five occupational categories and due to lower wages paid to blacks within occupational groups. For NLS men aged 23 to 27 in 1969 they find that over half of the 31 percent wage differential is due to lower wages for blacks within occupational categories. For men aged 17 to 22, the overall gap is smaller, 16 percent, and again, over half can be attributable to within occupation group wage differentials and slightly less than half to the different distributions of blacks and whites across occupational groups. There is no discussion of whether the smaller gap among the younger group is a life-cycle effect rather than a cohort effect. The remainder of the paper decomposes racial differences in several occupational outcomes. They conclude that by the late 1960s, nearly all of the occupational disadvantages of young blacks were due to lower endowments (e.g., father's socioeconomic status, schooling, ability). By then, young blacks and whites of similar endowments were treated equally in the labor market. In contrast, during the early 1960s, only half of the occupational disadvantages of young blacks appeared due to differential endowments, the rest due to more direct discrimination.

While those results point to substantial improvements in the labor market for young black males during the 1960s, Hall and Kasten caution that if further progress requires equalizing endowments, it may be more difficult to achieve than equalizing employer behavior toward blacks.

Kniesner, Padilla and Polachek (forthcoming) present evidence for the provocative assertion that "vintage" gains reported for young black males (the improvement relative to whites in the economic return to schooling that has been attributed to improvements in the quality of black schooling) in the early 1960s are, in part, actually effects of the business cycle (level of unemployment), nonneutral with respect to race. First, estimated returns to schooling are shown to be potentially biased by the parameterization of zero earners (i.e., the unemployed) in earnings functions. Including zero earners, truncating the sample, or including them and adding a dummy variable for zero earnings can substantially affect the estimated schooling coefficient, and these potential biases depend on the incidence of unemployment by level of schooling. Second, they suggest that the business cycle may affect the wage structure in a manner that is nonneutral with respect to race. (For example, increased unemployment may slow the earnings growth of those with more schooling by a greater amount than it slows earnings growth of the less educated.) The authors provide evidence for their assertions by estimating earnings functions (under alternative parameterizations of zero earners) by race for years 1966 to 1970 for both NLS younger men and older men. These results are interpreted with respect to the aggregate unemployment rate in those years, and the samples are also stratified and estimated separately by regional unemployment rates. While critics may not accept their complicated and

rather ad hoc methodology, they have taken an imaginative step in incorporating aggregate demand considerations into earnings functions within the human capital paradigm.

Interestingly, two studies comparing black and white earnings functions for NLS mature women (1967 data) report significantly higher returns to education and to occupational status for black women (Treiman and Terrell 1975; Hudis 1977). In addition, Mincer and Polachek (1974) find that the returns to education for black mature women are also "if anything" (p. S98) higher than those for white mature women. Similarly, Kohen and Roderick (1975) report higher wage returns to education and ability among black women in the NLS younger women sample (1969 data). However, working black women acquire less education, are in lower status jobs, and earn less on average than white women. Consequently, "only those few black women who have managed to surmount their problems of background and discrimination and acquire an occupation equal to that of the average woman attain comparable income" (Treiman and Terrell 1975:192). Hudis (1977) presents evidence that suggests that the greater returns to education and occupational status occur primarily among black women with more labor market experience. Of course, the greater "return" to education and occupation among black women could be interpreted in the opposite direction--a black woman with one less year of education or one less unit of occupational status is marginally disadvantaged more than a comparable white woman. Black women applying for better paying jobs may be more closely screened with respect to education and occupation than are white women.

Sex Discrimination in the Labor Market[6]

While racial differences in personal endowments such as socioeconomic origins and quality and years of schooling can be substantial (especially for older cohorts), within racial groups, the aggregate differences between males and females in these endowments are much smaller. This suggests that the sex differentials in economic success may be largely due to differences in the manner in which males and females are treated by employers in the labor market. For example, Link, Ratledge, and Lewis (1974) estimate reduced form wage equations for NLS full-time employed younger men and women. They found that nearly 40 percent of the wage gap between black and white males was attributable to the lower socioeconomic origin endowments of black youths, but that none of the wage gap between young white males and females could be attributable to differential origin endowments. (The latter finding should not be too surprising, since each family of origin is about as likely to have male offspring as female offspring.) Similar results are presented by Kohen and Roderick (1975).

While discrimination may channel women into occupations where they receive lower wages, have fewer opportunities for advancement, and receive lower return to their human capital investments, neoclassical human capital explanations for sexual differences in labor market experiences have also been offered. The NLS data have been used as evidence to support both of the opposing views. Polachek (1976, 1977; Mincer and Polachek 1974) has relied on the detailed labor force experience measures in the 1967 NLS mature women data to support his contention that sex differences in the labor market are largely due to

[6]Sexton (1977) also reviews the NLS-based studies of sex discrimination in her monograph summarizing research on woman and work.

the intermittency of female labor force participation and the lower post-schooling human capital investments of women. Polachek argues further that occupational segregation by sex is a consequence of a rational choice by women who expect to experience interruptions in their labor force participation. These women choose to enter occupations characterized by less "atrophy"--depreciation of human capital that occurs during interruptions.

Sandell and Shapiro (1976) point out an apparent misspecification in the Mincer and Polachek (1974) paper (concerning the treatment of general versus specific training and the endogeneity of time spent at home), and find that the human capital depreciation due to time spent at home had been substantially overstated. Consequently, according to Sandell and Shapiro, sex discrimination plays a much larger role in the earnings gap, with perhaps a fourth of the gap attributable to the differential labor market experience of males and females.

Jusenius (1976) confronts more directly the human capital explanations of Polachek and others, specifying a wage model for NLS mature women (1972 data) stratified into three occupational segments according to skill level.[7] (Skill level was computed from the Dictionary of Occupation Titles "Specific Vocational Preparation" rating matched to three-digit census occupation codes.) She found that the higher the skill stratum, the higher the returns to education and to recent and long-term experience, and the lower the disadvantage to a woman in a female sex-typed occupation. Women in the lowest strata

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[7] See Rosenfeld (1976) for a conceptualization and analysis from a perspective intermediate between Polachek and Sandell and Shapiro. She argues that intermittent experience and lower investment in human capital interact with structural barriers that inhibit the occupational advancement of women.

are disadvantaged both in human capital endowments and returns to those endowments. These results are presented to show that labor market segmentation as defined by both skill level and occupational segregation by sex results in economic disadvantage to women over and above that due to discontinuous labor force participation.

While not as substantively focused as the above studies, Suter and Miller (1973) published one of the first studies using NLS data to examine sex discrimination in the labor market. They compare earnings functions for four groups:

1. NLS women aged 30-44 in 1967;
2. NLS "career women" (worked at least six months in three-fourths of the years since leaving school);
3. all men aged 30-44 in the March 1967 Current Population Survey;
4. black men aged 30-44 in the March 1967 CPS.

They find that education, occupational status and work experience explain more variation in income for women than for men. More specifically, there is less variation in income among women of the same education, occupational status, and experience than there is for men who are equivalent on the same attributes. Women receive lower returns to education and occupational status, and 38 percent of the overall gap between mean income for men and women remains after controlling education, experience and occupational status. Their analysis is largely descriptive and does not directly address the competing explanations of labor market outcomes for women.

In a replication and extension of the study by Suter and Miller, Treiman and Terrell (1975) compare status attainment models of education and occupational prestige for working 30-44 year old NLS women to

similar models for men aged 30-44 in the 1962 Occupational Changes in a Generation Survey (Blau and Duncan 1967). They find the distribution of occupational prestige and years of schooling to be nearly identical for men and women, and the process of attaining these outcomes quite similar (except for a tendency for attainments to be more influenced by the socioeconomic origins of the parent of the same sex). However, their research speaks neither to the different career choices, expectations, and aspirations young men and women make while in school, nor does it address occupational segregation by sex as manifest in intra-firm authority structures and internal labor markets.

Treiman and Terrell compare earnings functions for working NLS women and their husbands. Working white wives earn 42 percent as much as their husbands, working black wives, 54 percent. White working women obtain a return to years of schooling only one-fourth as large as their husbands, and returns to occupational status about three-fourths as large as their husbands. If the mean attributes of white husbands are applied to the equation for wives, the overall earnings gap is reduced by less than one-half. However, they note that much of the differential return and residual gap could be attributable to family contingencies and choices made within a household decision-making framework (the issue that has intrigued so many economists in recent years).

When the earnings functions of black working wives and their husbands are compared, the differences are not nearly so large as those detected for whites. Working black wives receive nearly the same return to education and hours usually worked as do their husbands, and actually

receive a slightly higher return to occupational status. Differential endowments account for only about one-third of the overall wage gap between working black wives and their husbands. Treiman and Terrell note that overall, the earnings functions of both black wives and husbands fall about midway between those of white wives and the earnings functions of their husbands. They suggest that white wives appear to exercise the most discretion over whether to become committed to labor market or family activities. White husbands are totally committed to the labor market and are rewarded for their investments in human capital. Black husbands and wives, possibly because of economic necessity, overt discrimination, and different family decision-making processes, find themselves in an intermediate position. While these are simply speculations, they point to the interdependence of human capital investment processes, family decision making, and demand considerations of labor market segmentation, the structure of work, and employer behavior in explaining the different economic experiences of blacks and whites, men and women in the contemporary United States.

Unionization and Labor Market Differentials

Several researchers have used NLS data to examine the impact of unions on labor market processes. The NLS provides data on (for young and mature men since 1969, for young women since 1970, and for mature women since 1971) (1) whether earnings are set by a collective bargaining agreement; (2) whether the respondent is a member of the union; and (3) the type of union that negotiates the agreement. The NLS data are somewhat unique in this regard. Many widely used surveys provide no information on unionization

(e.g., the Censuses and Current Population Surveys), while others simply provide an indicator of labor union membership. Unfortunately, the NLS data on unionization appear to be underutilized.[8]

Leigh (1977) took advantage of the rich NLS unionization data in order to replicate and extend Ashenfelter's work (1972, 1973) on unionism and labor market discrimination against blacks. Leigh uses 1969 NLS data for mature males to examine the effects of labor unions on racial differences in wages and pension benefits. By estimating wage equations and pension coverage equations separately for black and white males, a standard decomposition can be employed to assess the relative contributions of the extent of black and white unionization (collective bargaining coverage) and of the effects of unionization among blacks and whites to racial differentials in wages and pension coverage. Leigh found that industrial unions tend not to limit entry of blacks, and they reduce the racial wage differential by about 3.5 percent. In contrast, craft unions do appear to limit entry of blacks, and their effect is to widen the wage differential slightly. Overall, both types of unions increase the probability of private pension coverage, and that advantage is somewhat greater for blacks than for whites.

Andrisani and Kohen (1977) use 1969 and 1971 data for mature and young men to examine the effects of collective bargaining coverage on wage rates, unemployment, and growth in earnings. The effects of unionization are assessed separately by race, age, and occupational category (craftworkers, operatives, and laborers). Surprisingly, large net union wage (hourly earnings in 1969) differentials, on the order of 30 to 50 percent, are

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[8] In addition to the two studies discussed below, Griliches (1976) finds a strong positive union differential for young men (see below), and Kalachek and Raines (1977) are undertaking research based on the NLS to assess the effects of unions on hiring standards.

detected among young craftworkers, white operatives and laborers, and middle-aged black operatives and laborers. Their findings provide little support for the hypothesis that the wage benefits of unionization are offset by higher unemployment rates; in fact, unionized black laborers are 15 to 24 percent less likely to experience unemployment than are their nonunionized counterparts. Unionized young workers experience less growth in earnings than do comparable nonunionized workers. The authors speculate that the unionized sector was more severely affected by the economic downturn of 1969-1971, thus accounting for the growth differential. However, young unionized workers could be receiving more on-the-job training, resulting in flatter earnings profiles over the 1969-1971 period.

Shapiro (forthcoming) uses 1971 data for mature men to examine the relative impact of unions upon wages within the public and private sectors. He estimates log-hourly earnings functions separately for white collar and blue collar white men and black men. He finds essentially no net wage advantage to collective bargaining coverage within the white collar public sector for men of either race. Nor do whites obtain a return to collective bargaining coverage within the white collar private sector. Blacks obtain a wage advantage from employment in the public sector (while whites do not), and the effects of unionization in the private sector are greater for blacks. Thus, Shapiro's results replicate those of others: less labor market discrimination toward black males in the public sector and in unionized jobs.

As Shapiro notes, the assessment of union effects is probably biased downward because, especially within white collar occupations, nonunionized workers are likely to be in better (higher status) jobs, and detailed occupational status is not controlled in the earnings function. Similarly, it may be

that unionized blacks and blacks in the public sector are in higher status jobs. Unfortunately, instead of incorporating occupational status directly into the earnings functions, Shapiro attempts to control occupation by obtaining separate estimates for broad occupation groups.

However, there is a more serious problem in assessing the effects of unionization from micro-survey data--an implicit assumption of historical equilibrium. White collar, public sector jobs may have recently become unionized because of low wages, and the resulting market impact may not have reached equilibrium. In contrast, many private sector industrial unions may be far past that stage. In the blue collar private sector, we are more likely to be observing wage differentials that exist because of unions. While earnings functions incorporating this dynamic dimension of unionization might be considerably more complex, they would also be more convincing. Efforts in this direction could then exploit the longitudinal nature of the NLS to examine the effects of unionization on changes over time in wages and other job related rewards.

Labor Demand and Structural Factors--Further Considerations

Several "demand" or "structural" perspectives are virtually absent among research based upon the NLS. Hardly any research focused explicitly on job competition, queuing mechanisms for rationing jobs,[9] screening, and signalling processes. While screening-type hypotheses are admittedly difficult to test (Lazear 1977c; Cain 1976), some explicit conceptual models have been proposed (Spence 1973; Starrett 1976), and the NLS data contain considerable information on the process whereby individuals search for and acquire jobs (at least from

[9] Exceptions include two largely descriptive papers on job rationing (Furstenberg and Thrall 1975; Thrall and Furstenberg 1975).

the employee's side of the transaction). Nor have we come across any research utilizing NLS data to examine social class and economic success from a Marxist perspective. Other research in this area (Wright and Perrone 1977) has relied upon information on an individual's position in work authority hierarchies, data not collected in the NLS.

IV. HUMAN CAPITAL AND STATUS ATTAINMENT MODELS

Human capital and status attainment models represent the processes determining individual labor market success.[10] Empirical estimation of such models relies almost exclusively on cross-sectional social surveys of individuals. Human capital is a choice-theoretic approach to individual investment in productive capacities. Status attainment models have typically focused upon the intergenerational transmission of socioeconomic success. Since the resources that vary by family background affect the costs of and returns to human capital acquisition, both perspectives are concerned with the generation and transmission of socioeconomic inequality. The NLS data provide extensive information on social origins, human capital acquisitions, and labor market outcomes for the four cohorts of individuals. But more importantly, the data have been collected longitudinally, and thus are particularly suited to research on processes that develop over the life cycle. Much of the NLS-based research that deals with racial and sexual differentials in human capital acquisition and status attainment is summarized elsewhere in this report. What we discuss here by no means completely covers research in those areas that rely upon the NLS. However, it does include a variety of approaches to empirical research from the two perspectives.

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[10] We consider work in the sociology of education that utilizes NLS data to be subsumed as a sub-area of status attainment models.

Human Capital

Wallace and Ihnen (1975) use 1966 through 1969 NLS data for younger men to analyze the length of time devoted to educational investment. They first show that the determinants of schooling length can be derived from the Ben-Porath (1967) life cycle model. However, estimation is quite difficult. Thus the authors develop and estimate an alternative life cycle model based on the assumption that funds to pay the direct costs of schooling cannot be borrowed but instead must be financed out of current cash flow. They operationalize the model as follows. Socioeconomic origins (parental education, father's occupation, family size, race, and school quality) affect the price of acquiring schooling, since they indicate the family's and community's willingness to provide financial support; ability (measured IQ or "knowledge of the world of work") reflects the capacity of an individual to absorb schooling. As shown by Haley (1973), initial human capital stock is negatively related to years of schooling, since it is an indicator of the opportunity cost of schooling. They use the concept, introduced by Mincer (1974), of the overtaking point among experience-earnings profiles that differ by education in order to estimate initial human capital stock for individuals in their sample. They measure this stock by discounting (at a rate of 25 percent) an individual's earnings at the overtaking time (assumed to occur four years after completing schooling). They explain 30 percent of the variance in years of schooling completed, with both social and economic variables having modest effects. The function they estimate, and consequently their results, are quite similar to those usually obtained in status attainment models. Their analysis differs from status attainment though in that theirs is grounded in an explicit life-cycle investment model.

Lazear (1977a) examines whether education is a consumption good in itself, as well as a productivity enhancing investment. That is, his model allows for the possibility that an increase in wealth increases the demand for schooling, while, simultaneously, increased schooling results in increased wealth. His empirical results are based on an elegantly derived but rather complicated set of equations estimated from information on NLS younger men in 1966 and 1969. He finds that individuals obtain less than their wealth-maximizing level of education because, as a consumption good, at the margin schooling is a "bad" (except perhaps at the highest levels of schooling). Lazear suggests this result is consistent with the findings of others that the rate of return to investment in schooling exceeds the rate of return for investment in physical capital. Apart from its (perhaps controversial) contribution to the consumption aspect of the "does schooling matter" debate, Lazear's research is impressive in several respects. First, he exploits the longitudinal nature of the data, using information on schooling and wage changes between 1966 and 1969 as part of his estimation procedure. Second, the change variables are introduced because they are derived from his formal model; they are not entered in an ad hoc manner. Third, not only is he aware of the strong assumptions necessary to identify the model, but he evaluates the robustness of his findings with respect to departures from those assumptions.

In another paper, Lazear (1977b) uses 1966 and 1968 data on NLS younger men to posit and test a human capital explanation for the lower wages received by students who work. According to his model, the net 15 percent disadvantage in student wage rates is an equalizing differential

for more flexible and less demanding jobs. He finds no support for the proposition that the wage differential is due to on-the-job experience received by students, nor for the proposition that geographically limited students bid down wages in a glutted labor market. Lazear notes the implication that the opportunity cost of schooling will be understated if foregone earnings are computed from student wage rates.[11] He also suggests that cross sectional estimates of the return to schooling for young workers will be biased downward due to the equalizing differential between less educated drop-outs and student workers. While not as provocative as his other paper, this paper is notable in that the human capital model provides a clear substantive rationale for exploiting the longitudinal nature of the NLS data.

Griliches has done a great deal of research on the determinants of the labor market success of young men. His work is exceptional in the care it exhibits for the endogeneity of certain right hand variables and the interest he displays not only in the direct but also the indirect effects of family background on later labor market success. Until recently this concern has been much more characteristic of the status attainment literature in sociology than in the human capital literature of economics.

Using 1969 young men data Griliches (1976) seeks to determine the percentage increases in the wages of young men due to schooling, family background, work experience and ability. He uses two measures of ability, IQ scores and "knowledge of the world of work" (KWW), both of which are assumed to be measured with error. He views the former, available for

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[11] Parsons (1974) also uses NLS young men's data to show that foregone earnings understate the time cost of schooling, since students sacrifice leisure as well as earnings.

only 65 percent of the respondents, as a measure of early ability and the latter as a measure of late ability that is unlikely to be independent of educational attainment. Both structural and reduced form estimates of the determinants of (log) wages are presented as well as 2SLS estimates with schooling considered endogenous. His major finding is that while ability and family background matter very much for educational attainment, they add little additional explanatory power to the wage equation that already contains education, experience and other explanatory variables. As he says in a later paper (1977a), ". . . schooling does appear to remain a major avenue for reducing systematic wage differences between various groups in society." Years of experience matter also, raising wages as much as 6 percent in the first years and slowly declining afterward. An even stronger determinant of wages for these young men is union membership, which raises wages by 20 percent, though it must be supposed that its impact on permanent income is likely to be much less substantial.

Kohen (1973) estimates a similar model of labor market success using as his sample the 1966 young men out of school. His is a three equation recursive model used to explain IQ, educational attainment and labor market success (wages or occupational status). His model is somewhat weaker in that it excludes consideration of work experience and relies on a composite index of family background. The composite does not seem well-chosen, since its five components can be expected to have varied effects on the dependent variables (Hauser 1972). His additional family background measure of number of siblings, though, was a worthy choice for investigation.

Parnes and Kohen (1973) also analyze the determinants and consequences of respondents' scores on the knowledge of the world of work (KWW) test administered to the younger male cohort. They agree with Griliches that these occupational information scores are in part determined by educational attainment and family background variables. However, rather than interpreting KWW as a measure of general "late ability" they see it as a proxy for knowledge of labor market conditions. Thus they interpret the small but positive effect that KWW has in reduced form wage functions not as a payoff to on-the-job productivity but instead to skills in acquiring employment.

Griliches (1977a) analyzes the young men's sample again, this time using the 1970 data and concentrating on earnings in addition to wages. The story with respect to wages for this cohort, now a year older, is substantially the same as that of his earlier paper (see above). The determinants of earnings, however, can be different from those of wages, since the former contains a labor supply component. Major results include that net of schooling, the impact of IQ on earnings is even smaller than on wage rates; net of other factors, being black is consistently harmful to earnings; and there is some evidence that those with more education have greater employment.

In another paper, Griliches (1977c) finds that maintaining a job while in high school is unrelated to family background and that work experience seems to have no effect on subsequent wages. Another result is that those who interrupted their education and then returned to school receive on average the same return to schooling as those who pursued their education continuously.

Grasso and Myers (1977) use a human capital approach to analyze the labor market success of young men as of 1971. Using a variety of models that involve four different dependent variables in linear and/or log form and both dichotomous and continuous specifications of measures for educational attainment, they find that the rewards to education and experience are complementary (i.e., they interact positively). However, the racial differences in the gross returns to schooling seem to be ambiguous and difficult to interpret. In the same paper, they compare the early labor market success of whites who had completed their schooling in 1966 with those who finished in 1969, and find that both college graduates and high school graduates in the later cohort suffered a decline in full-time wages. What is unique about their paper is that the authors emphasize the historical context of the labor market in the second half of the 1960s. They present evidence that the Vietnam War had a large impact on the labor market behavior of those who remained civilians. College graduates in abnormally large numbers found low pay, high status and most importantly, draft-deferred jobs as school teachers, and high school graduates had great difficulties in securing employment that offered substantial on-the-job training.

School quality as a determinant of earnings has been a focus of intensive research in the last decade. In two papers using respectively the 1967 and 1968 data on young men, Link and Ratledge (1975a, 1975b) find that for both races, secondary school quality, measured as annual district-wide per pupil school expenditures, has a positive effect on earnings, even after controlling for years of education, work experience, residential location and student ability. Their studies, which extend the work

of Johnson and Stafford (1973), suggest that the large gains to blacks in the 1960s have been due more to increases in school quality than to quantity, and that the school quality margin still can be profitably exploited, although this finding would certainly be vigorously contested by other researchers involved in "The Great Schooling Debate." Indeed, Parnes and Kohen (1973) use the data on young men and Mott and Moore (1976) use the data on young women to show that the effects of school quality on socioeconomic success are minimal.[12]

Vocational training schools increasingly have been recognized as important vehicles for human capital acquisition. They are unique among post-secondary educational institutions in that almost all are private profit-making enterprises. Their courses tend to be short, job placement is closely linked to classroom education, and the students they attract typically maintain part-time employment while attending. Freeman (1974) analyzes the net private returns to vocational training for both NLS male cohorts. In general he finds that the private rate of return to vocational training is on a par with the average return to academic training. In a more sophisticated study, Olson (1976a) takes into consideration the simultaneous nature of the allocation of time to investment in training and to market work, and similar conclusions are reached.

In a study of occupational training that uses the older male sample, Adams (1974) finds that past occupational training such as participation in company schools, business and technical institutes, and the Armed Forces had a significantly positive effect on earnings in 1966 for both blacks and whites, even after controlling for other factors such as

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[12]See Olson (1976b) for another NLS-based study of the impact of school quality on the labor market success of blacks and whites.

educational attainment, age, health status, and job tenure. Next he considers the returns to training acquisition between 1966 and 1969 and finds that those with training prior to 1966 benefitted most from training in this period. Training between 1966 and 1969 contributed only slightly to earnings for those without previous occupational training. Since blacks are less likely than whites to have past training, it is not surprising to find them underrepresented in formal occupational training programs during middle age. However, caution is advised before concluding that there is little payoff to this late career human capital acquisition, since its effects on earnings may have been offset by depreciation of other forms of human capital. Adams also investigates the employment effects of occupational training and finds little relationship between past training and the likelihood of current employment.

Sociology of Education

Probably the most thorough report pertaining to the sociology of education is by Shea and Wilkens (1972). While their paper is admittedly "inductive and exploratory," the authors do consider a wide range of variables dealing with the determinants of educational attainment and retention in school. Among the variables most directly related to the schooling process itself, Shea and Wilkens utilize high school type, curriculum, expenditures per pupil, the presence of a college in the area, a school quality index, and extracurricular activities. They further consider such social psychological factors as educational and occupational aspirations and expectations, attitudes toward school, and reported delinquent behavior.

In addition, Shea and Wilkens analyze a number of demographic and socioeconomic background variables, as well as several variables dealing with the labor force (participation, supply, knowledge of world of work), the family (family structure and size, access to reading material), and ecological factors (unemployment rate, labor demand for male youths). Using a rather interesting (though perhaps statistically dubious) algorithm known as Automatic Interaction Detection Program, the authors document the importance to the attainment process of race, family structure and size, economic conditions, quality of schooling, and education expectations.

Noticeably absent from Shea and Wilkens' analyses is any consideration of the attainment process of young women, a cohort largely underutilized in the NLS. In light of much recent work in the sociology of education, this constitutes a significant gap in the literature. An exception is a paper by Waite and Moore (1977), in which the authors specify and estimate a model of educational attainment, incorporating the effect of a young woman having an early first birth on total years of schooling completed. Waite and Moore are careful to point out the caveats in their work. The longitudinal nature of their study forces them to restrict their sample in such a way that many of their intergroup comparisons must be interpreted cautiously. Further, the lack of a childbearing history for each respondent in the NLS probably results in an underestimate of the effect of age at first birth. However, their results may be even further confounded by analyzing effects on total years of schooling rather than post-birth schooling.

Another exception that examines the educational attainment of women is a series of papers by Sandell (1976, 1977a, 1977c) that apply a human capital approach to the demand for college and the demand for college quality. In the first of these papers, Sandell documents "only limited additional college enrollment associated with the existence of local public colleges," an important finding in that it "conflicts with widely held assumptions." In his more recent papers, Sandell attempts to clarify many of the correlates and mechanisms associated with attendance at colleges of greater or lesser quality. Sandell's papers are relatively comprehensive, and his findings are suggestive. While one may wish Sandell had exploited the longitudinal nature of the available data, and while theorists not of a human capitalist perspective might quarrel with his explanations for his results, Sandell's work does effectively utilize both cohorts of young respondents.

A relatively unexploited area of the NLS data involves the effects of the high school curriculum on earnings, an issue of increasing interest to sociologists of education. A notable exception is a study by Grasso and Shea (1972). While they find few robust effects of the high school curriculum for future earnings, both the longitudinal nature of their study and a number of potentially interesting interaction terms in their model provide some appealing insights for future research.

Educational and occupational aspirations of the young can be important factors in their eventual educational attainment and labor market success. In models of socioeconomic attainment they can be seen as intervening variables that link the precursors of success (status of parents, IQ) with future adult success (income and status). Grasso and Kohen (1977)

seek to explain the educational and occupational attainment aspirations or goals of the young men cohort who were in high school in 1966 in terms of their family background, their capacities, the information they possess, and the constraints they face. They find that the gross effects of family background are substantially diminished when proxies for the other concepts are introduced. On the basis of regressions that weight the determinants of actual educational attainment for those in the young men cohort who had completed their schooling, the authors analyze the realism of the educational goals of those in high school. They find that more black (two-fifths) than white (one-fifth) high school students had unrealistically high educational goals--that concept operationalized as expecting a college degree when less than one-half year of college was predicted. Grasso and Kohen also discover those students who appear to have an incongruity of educational and occupational goals. Finally, taking advantage of later surveys, they find that the revision of aspirations is related to goal incongruity and unrealistic expectations, evidence that goal formation is an adaptive process.

Except for the work of Grasso and his co-authors, two important areas of the sociology of education have been underutilized in research based on the NLS. First, high school curricular and extracurricular measures have received little attention. Also greatly underutilized are a number of questions pertaining to the social psychological aspects of schooling, particularly aspirations and expectations.

Probably the most glaring gap in the NLS-based educational literature is the neglect by non-CHRR researchers of any cohort but young men. While this cohort is the most appropriate object of analysis for many questions, the changing position of women in both the educational and

occupational spheres makes the neglect of the cohort of young women particularly troublesome. Further, it is somewhat surprising that the educational experiences of the two cohorts of mature respondents have not received more consideration.

Status Attainment

Extensive analyses of intragenerational mobility for the NLS younger and mature men are presented by Kohen (1977b, 1974) in the most recent CHRR monograph series (Career Thresholds, Volume 6, and The Pre-Retirement Years, Volume 4). Kohen examines mobility for younger men from first job after completing schooling to 1971 occupation, and mobility for both cohorts, from 1966 occupation to 1971 occupation. Descriptive results of the amount of mobility among major occupational groups shows, not surprisingly, substantial occupational change for young men and little change for older men. Kohen presents regression models of the likelihood of upward movement and of the distance of movement separately for those who change employers and for those who do not; results are presented separately by race. It is difficult to briefly summarize so much research that is relevant to status attainment processes, internal labor markets, racial discrimination, and the utilization of human capital over the life cycle. We can only suggest that these particular reports deserve considerably more attention and scrutiny from non-CHRR users of NLS data than the monograph series have generally received in the past.

While much of the research using NLS data for women is discussed elsewhere in this report, two studies have a specific focus on intergenerational occupational mobility. Tyree and Treas (1974) use 1967 data for mature women to replicate their findings from other sources of

data. They find that the marital mobility patterns of women (from parental head of household's occupation to husband's occupation) are more similar to the intergenerational occupational mobility patterns of men than they are to the mobility patterns of women. Men and women differ more in their respective occupational destinations than in their destinations in marriage, and "about twice as many working women would have to change jobs as wives would have to change husbands for the two sexes to have the same mobility matrices" (p. 300). Rosenfeld (forthcoming) uses the same data to show that mother's occupation as well as father's occupation influences the mobility patterns of women. While both studies suggest role-modelling and occupational segregation as underlying mechanisms, neither are incorporated into the analyses.

In addition to the paper by Kniesner (1976), discussed in an earlier section, at least two other studies use NLS data to assess the intergenerational effects of marital instability. Freeman (undated, b) examines the degree to which NLS young men (1969 data) are disadvantaged in their educational and labor market attainments because they were raised in families without both parents present. The net educational disadvantage from a broken family is about one year for whites, less than .7 for blacks. There are virtually no effects of broken family on occupational and economic success other than those transmitted via schooling. While the effect is larger for whites, the incidence is much greater for blacks. Consequently, origin family structure accounts for a small proportion of black/white differences in socioeconomic success.

Pope and Mueller (1976) use 1967 NLS data on mature women, along with four other sources of data, to examine the intergenerational transmission

of marital instability. They detect very little transmission of marital instability, and no racial differentials appear consistently across data sets. Because of their inconclusive results, their analyses neither confirm nor support various role model theories of how parental marital disruption effects the later marital stability of their children.

Overall, the above summary of research seems to show that economists have utilized the NLS data much more than have sociologists, despite the communalities between human capital and status attainment perspectives. For whatever reasons, these data have been underutilized in status attainment research.[13]

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[13]Sociologists seem to have more sources of data to choose from, since many sociologists design and conduct their own surveys. Most economists are not trained in survey design; consequently they rely more often on the public use data sets available from the Census Bureau and those few sources of data such as NLS and the Panel Study of Income Dynamics that have been designed by economists.

V. UNEMPLOYMENT, JOB SEPARATION AND JOB SEARCH

The two recessions of the last seven years and the high rates of unemployment experienced in times of high aggregate demand have stimulated a great deal of research about the nature of that unemployment and its relation to unemployment benefit levels. It is sometimes suggested that the higher "full employment" levels of unemployment of the 1970s as compared to the previous two decades are in part due to liberal benefit policies. Ehrenberg and Oaxaca (1976) test that proposition and also analyze whether there is any relationship between unemployment duration and subsequent wages attained on becoming employed. The authors separately analyze the unemployment experiences of all four NLS cohorts. Their study is unique in that their sample of unemployed workers is not restricted solely to those who are covered by unemployment insurance (Welch 1977). For all four cohorts the authors find that unemployment benefit levels are positively related to the duration of unemployment. However, for the older male and female cohort they also find that longer durations of unemployment pay off to these workers in the form of subsequent wage gains. No wage gain effects were found for the two younger cohorts, but it is possible that such gains could be disguised in the form of greater on-the-job training.

Grasso (1977c) explores the reason for the job separations that the young men cohort experienced between 1970 and 1971. Job separations are classified as either (1) involuntary, (2) voluntary with firm knowledge of source of next employment, or (3) voluntary but no next job lined up.

He shows that the probability of each type of separation is related to race, marital status, education, experience and current job tenure. For example, married men are more likely than single men to know the source of their next job when they separate. It appears that blacks obtain less employment stability for the same amount of job tenure than whites, although the analysis is hampered by a relatively small number of observations. In addition, Grasso uses job separations rather than individuals as the units of analysis in order to relate both the probability and duration of unemployment to the variables above and in order to see if behavior after separation is consistent with human capital explanations of job search and job turnover.

Kohen (1977a) presents a preliminary analysis that suggests that the probability of a voluntary quit of first post-school job by young men is, ceteris paribus, inversely related to the wage rate for that job. In addition, controlling for other factors, blacks seem to have higher turnover rates.

Somers and Warlick (1975) use the young male sample to evaluate the usefulness of the manpower programs in which some of these men participated. Evaluation of manpower programs is plagued by the problem of identifying the appropriate reference group. A danger in program evaluation is the attribution of participants' later success to the program itself when a strong possibility exists that these men may have entered the program with the skills, attitudes and other characteristics that were responsible for their post-program wage and occupational attainment. Aware of these pitfalls, their paper nevertheless promotes a cautious optimism about the value of manpower programs to those who complete them.

Another study of the labor market problems of youth is by Egge et al. (1970). They attempt to evaluate the effect of changes in the minimum wage law on the employment opportunities available to young men, but present no research strategy capable of answering their question.

Little research using the NLS data has been devoted to studying the unemployment experience of women. Female unemployment rates are more difficult to estimate with precision since their magnitudes can be disguised by their more frequent entry into and exit from the labor force. Sandell (1977b) and Furstenberg and Thrall (1975) present two exploratory attempts to come to grips with this issue. In addition, Shea (1972) presents the frequency and duration of unemployment of young women by the occupation of their last job in order to provide the basis for a discussion of the extent of the problem and the necessity of a manpower policy solution.

A completely different kind of unemployment research has been undertaken by Rhodes and Fleisher (1977). In their paper, Rhodes and Fleisher present a methodology that they suggest will help resolve the widely conflicting time series and cross sectional estimates of the number of discouraged workers. Their study takes as a starting point the family labor supply model. The authors use probit techniques to handle the simultaneity of household decisions and sample selectivity in labor force participation.

Middle-aged men are at a life-stage in which they typically have acquired large amounts of specific training. Thus their mobility is frequently very low, and job separations can be career threatening. Two studies of job separations among the older male cohort are by Parnes and

Nestel (1974b) and by Parnes and King (undated). In the first study, Parnes and Nestel find that the propensity to change jobs, as measured by hypothetical questions about the wage requirements needed to induce a move, is greater for those with little job tenure, those in the younger ages in the sample, and those not covered by private pension plans. In addition, both the propensity to move and the frequency of voluntary job separations were greater in the period 1966-1969 when aggregate unemployment rates were low than between 1969-1971 when economic conditions were much worse. Parnes and Nestel also find that voluntary movers were likely to enjoy subsequent wage growth over the next several years that was on a par with stayers. In contrast, those who were involuntarily separated from their jobs experienced much less subsequent wage growth.

Parnes and King take a closer look at involuntary job separations. They choose as their sample men in the older cohort who had at least 5 years of job tenure by 1966 and who were permanently separated from that job in the 1966-1971 period. Agricultural workers and construction workers were excluded from the sample. The men remaining comprised 99 observations or slightly less than 5 percent of the population. Four-fifths of these men had been fired or permanently laid off from the longest job they had ever held. These 99 men had distributions of personal characteristics such as age, race, educational attainment, and job tenure that virtually matched the population distributions. "It appears that the risk of displacement from a job after reasonably long tenure is surprisingly insensitive to conventional measures of human capital and to the particular occupations in which men are employed" (p. 8).

Not so surprisingly, the authors find that these men would subsequently experience less occupational attainment and smaller earnings than those who were not chosen for job separation. In addition, these men were more likely to feel that they had experienced age discrimination, and they had a greater sense of powerlessness about their lives, as measured by the Rotter I-E test, than a matched control population.

The sample of men that Parnes and King describe above is a small part of the total number of men in the older cohort who experienced some unemployment between 1966 and 1971. Over 60 percent of these men who experienced some unemployment in this period experienced no change of employers. It is this fact and similar figures from other surveys which show that "temporary" layoffs are a significant portion of measured unemployment. For this reason, Feldstein (1975) suggests that search-theoretic explanations for the behavior of the unemployed are misconceived. Similarly, a money illusion explanation for the statistical Phillips curve is also misguided since workers return to their jobs not because they are fooled about the real wage rate they are being offered, but because the job again has become available. That the rehire rate is so great is a reflection of the great importance of firm-specific training in our economy. Feldstein presents provocative "facts" and calls for a rethinking about labor market operations. While he presents no alternative theory himself, much of what he says is consistent with the job queue vision of the labor market suggested by Thurow (1975) and other economists critical of the neoclassical perspective.

In general, we find a real need for more research on the unemployment, job separation, and job search experiences of these four cohorts. What little

that has been accomplished on these topics has been done primarily by CHRR researchers. While good data on job separation and unemployment exist for all four cohorts, we suspect that the general lack of attention by outside researchers to these experiences is due, at least in part, to a lack of methodology capable of evaluating the matching and unmatching of jobs to people.

VI. SOCIAL PSYCHOLOGICAL FACTORS

The NLS contains data on a variety of social psychological variables that plausibly influence an individual's labor market experience. These include job satisfaction, locus of control, work attitudes, and a variety of measures of aspirations and expectations. In a cross-sectional analysis of the labor force participation of mature women, Knutson and Schreiner (1975) examine the effects of women's attitudes toward work and husbands' attitudes toward wives working. Husbands' attitudes were coded "1" if the wife indicated he liked the idea; "0" if the woman was single or indicated that her husband didn't care; and "-1" if she indicated that he disliked the idea. For women's attitude toward work, the authors used, surprisingly, a proxy which was set equal to one if the woman was a resident of a large city at age 15.

Using a dichotomous measure of labor force participation (LFP) as their dependent variable, the authors demonstrate that each of their attitudinal measures exerts significant negative effects on LFP, net of measures of social status, residence, work experience, family income, and education. They provide no explanation for these results, which is somewhat surprising in that the results are not necessarily what one would expect a priori. Their measure of husband's attitudes is unnecessarily restrictive in that it imposes equal and opposite effects on female labor force participation for nonneutral preferences of husbands. Further, they give no theoretical justification for their proxy for women's work attitude. While Knutson and Schreiner do identify a number of important determinants of LFP, they treat their attitudinal measures as being of only peripheral importance.

Bould (1977) utilizes the measure of the husband's attitude toward his wife working in a cross-racial comparison of the wife's contribution to family income. She finds that "The husband's attitude is a key difference in the response of black and white wives," in that black husbands were found to be much more favorable to their wive's employment than were white husbands. She further demonstrates that this attitudinal measure is an important exogenous variable in a model explaining women's income contribution, and that it operates dissimilarly for whites and blacks. More generally, Bould interprets her results as a refutation of Moynihan's thesis of the matriarchal family structure among blacks.

The role of work attitudes has also been considered by Mangen (undated), who analyzes the factors leading to early retirement among men. Specifically, Mangen is interested in what he conceptualized as "work commitment," which was coded as a dummy variable for the response to a question of working without financial need. He also incorporates into his model measures of both intrinsic and extrinsic work dissatisfaction.

Mangen stratifies his sample into men with and without working wives, and uses correlational and multiple regression analysis. While the effect of these variables on LFP is seldom robust, Mangen's analysis does provide support for the importance of their inclusion in the specification of models of decision-making.

Drawing on a subsample of 98 men who withdrew from the labor force between 1966 and 1967, Parnes and Meyer (1971) find no compelling evidence suggesting that "unfavorable attitudes toward work or job constitute a substantial explanation for . . . withdrawal from the labor force." Despite the small sample size and relatively simple nature of the statistical

analysis, this finding is an interesting one. In a somewhat similar analysis, Parnes and Nestel (1971) conduct a thorough longitudinal study examining the effects of a variety of attitudinal variables on the retirement expectations of middle-aged men. They find these variables to be in many cases important noneconomic determinants of early retirement.

Parnes and Spitz (1969a, 1969b) use a dichotomous measure of job satisfaction as an exogenous variable to explain the propensity of older and younger workers to change jobs. Using descriptive crosstabular techniques, the authors demonstrate the expected result that "men who say they like their jobs are less likely to be mobile than those who express lesser degrees of satisfaction."

All of the studies discussed thus far have used social psychological measures as explanatory variables; other analysts have been concerned with assessing them as dependent variables. Nicholson and Roderick (1973) use multiple classification analysis on the 1968 cohort of young women to analyze the determinants of job satisfaction. In addition to documenting the importance of race, education, marital status, and convenience of job location as determinants of job satisfaction, they find that the occupational expectations of a young woman significantly influence her degree of satisfaction with her job.

Andrisani and Nestel (1976) use a variety of social psychological variables in a longitudinal analysis of mature men. The authors are mainly concerned with the NLS measure of internal-external control, both as an exogenous and as an endogenous variable. In addition, they are concerned with the role of job satisfaction, changes in job satisfaction, and perceived financial progress.

As the authors note, "In the framework of Rotter's social learning theory, internal-external locus of control refers to the degree of control to which an individual perceives success and failure as being contingent upon personal initiative." Using this conceptualization and regression analysis, Andrisani and Nestel demonstrate that internal-external control both influences success in the world of work and is in turn influenced by this success.

Another study concerned with the Rotter Internal-External locus of control scale is conducted by Bould (1977). Bould restricts her sample to mature women never married or living apart from their spouse, who are nonfarm residents, and who have at least one child under age 18. Her basic hypothesis is that the source as well as the amount of income which these women received would affect their sense of personal fate control.

On the basis of her regression results, Bould concludes that "poor women and women who must depend upon AFDC, child support, and other stigmatizing or unstable sources of income feel less able to plan for their lives." While one might wish Bould had more fully specified socioeconomic background, her results do suggest certain policy implications.

A study which draws fairly heavily on the available social psychological data in the NLS is by Shea and Wilkens (1972). The authors are concerned with, among other things, the effects of educational and occupational aspirations and expectations on educational attainment and retention. They find these variables to be crucial to the educational

process, and in fact "educational expectations emerged as the strongest predictor of entrance by high school seniors to college in 1967." While their study is limited to the cohort of young men, it successfully explicates the importance of these social and psychological mechanisms in the attainment process.

In a longitudinal analysis of the cohort of young women, Waite and Moore (1977) incorporate measures of parent-teacher help and parents' educational goals into their model of educational attainment. While these measures are not the focus of their work, Waite and Moore do obtain highly significant effects of these variables, net of respondent's age at her first birth, family background, and social and demographic traits.

In sum, most of the social psychological measures contained in the NLS have been extensively utilized. However only a minority of those studies employing social psychological variables use them as their focus of analysis. The major emphasis seems to be on the role that these variables play in labor market phenomena in conjunction with variables of different types. A possibility for future research projects would be a more in-depth analysis of the social psychological variables per se.[14]

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[14]Paul J. Andrisani (1976b, 1977a, 1977b) and his colleagues (Andrisani and Abeles 1976, Andrisani et al. 1977, Andrisani and Miljus 1977) have recently completed a series of reports of job satisfaction and locus of control among all four cohorts of NLS respondents. Unfortunately, we received these papers too late to summarize and evalute them for this report. Andrisani et al. (1977) contains the most comprehensive treatment of their research.

VII. AGING

As Parnes et al. (1968) remark in their introduction to the first volume of The Pre-Retirement Years, "men between the ages of 45 and 64 constitute an intriguing group for a labor market study." Indeed, the NLS cohort of mature men does contain a great deal of information pertaining to the work experience of these men. Of particular importance to the life cycle of this cohort is the experience of aging.

This volume exhaustively considers a vast range of variables applicable to this cohort. While the volume is clearly too extensive to be considered in depth here, the authors are basically concerned with explaining variation in the dependent variables of labor force participation, unemployment, and mobility through explanatory variables under the general headings of formative influences, skills, health and physical condition, labor market information, marital and family characteristics, financial characteristics, attitudinal variables, and environmental variables. While the statistical techniques are basically limited to simple cross-tabular analyses, the volume does allow a reasonably comprehensive overview of the data.

Volumes 2 and 3 of this monograph series begin to exploit the longitudinal nature of the data. In Volume 2 (1970), Parnes et al. discuss the changes that have been occurring in selected personal characteristics of the respondents, in their labor force and employment status, and in their jobs. Again, the statistical analysis consists

almost exclusively of cross-tabulations. Nevertheless, the authors do comment on the substantial degree of stability among middle-aged men, and note the crucial importance of both health and race to men's labor market position.

In Volume 3 (1972), Parnes et al. basically continue this line of analysis, describing changes that have been taking place in the cohort. Volume 4 (1974) also presents descriptive accounts of the magnitude and direction of the changes that have been occurring in the data, but further offers a number of substantively oriented papers dealing with the work lives of middle-aged men. While most of these papers have either already been discussed or will be discussed below, it is worth noting that this volume makes an important contribution to a fuller exploitation of the NLS data.

In addition to the papers included in the monograph series, several other studies on issues pertaining to aging have been conducted. In a thorough study of the retirement expectations of middle-aged men, Parnes and Nestel (1971) hypothesize that four sets of factors will influence the age at which a man expects to retire from his regular job: (1) financial need; (2) financial resources in the absence of work; (3) ability to work; and (4) economic and noneconomic rewards in continuing to work. Their analysis is conducted on the 1966 and 1967 cohorts of mature men.

Using both bivariate and multivariate techniques, Parnes and Nestel conclude that both economic and noneconomic factors are important in conditioning voluntary retirement. While their focus on the expectation of early retirement does not allow them to assess the role of compulsory

retirement, the authors do effectively identify correlates of early retirement in such diverse areas as labor force experience, job classification, demographic characteristics, educational characteristics, the presence of a pension, the respondent's assets, family variables, health conditions, and social psychological variables.

In a somewhat similar piece of research, Parnes and Meyer (1971) address the question of the process of labor force withdrawal. To do this, they draw a subsample of 98 men who withdrew from the labor force (for whatever reason) between 1966 and 1967. Despite the small sample size and a reliance on bivariate relationships, Parnes and Meyer document many plausible determinants in this type of change of labor force status. They especially emphasize the importance of poor health as a factor affecting labor force withdrawal. This is a particularly important finding in that the data used to determine this are longitudinal and hence not subject to the problems of retrospective questions, traditionally a serious limitation in the measurement of health related variables.

In an interesting regression analysis focusing on power in families, Mangen (undated) specifies his dependent variable as reduction in hours of labor force participation among mature men. As he defines it, "It is a dummy variable--coded one if the respondent decreased his hours of labor force participation by 1000 or more from 1967 until 1971, and zero if he decreased slightly, maintained his existing rate, or increased his participation."

Basically, Mangen is concerned with the outcomes of a familial decision making process on early retirement. To do this he estimates a series of models regressing reduction in LFP on a vector of 20 different variables from the areas of bases of familial power (husband's income, wife's income, husband's occupational status, wife's occupational status, husband's education, wife's education, proportion of total family income provided by husband, proportion of total family prestige provided by husband, proportion of total family education provided by husband); other family resources and characteristics (total family income, total net family assets, number of dependents); individual characteristics (husband's age, wife's age, race of husband); and occupational characteristics (work committment, intrinsic dissatisfaction with the job, extrinsic dissatisfaction with the job, health limitations related to the occupation, availability of pension income supplemental to Social Security). On the basis of his models, Mangen pursuasively argues for "the utility of conceptualizing retirement as a familial decision making process."

Another important aspect of aging is the question of health. In a cross-sectional study comparing the earnings and labor market activity of healthy and disabled men aged 45 to 54, Davis (1972a, 1972b) asks the following two questions: "Do men with 'health problems' have lower annual earnings than healthy men? If so, to what extent are they the result of lower hourly wage rates and to what extent are they the result of fewer hours worked?" Davis' results suggest that poor health negatively affects annual earnings through both total hours worked and hourly rates of pay. Davis' analysis is important in that it is one of the few which focuses

on the NLS health data, but he neglects to control for either background or job-related variables. (A recent study of health and labor market experience by Andrisani (1977c) was received too late for inclusion in this report.)

As the papers summarized above illustrate, studies that use the older male cohort and explicitly focus on their economic experiences as they approach retirement have been conducted almost exclusively by CHRR researchers. An encouraging exception is Munnell (1976), who is interested in estimating the impact of social security and private pension coverage on personal savings in the pre-retirement years. Her empirical work is based on the Ando-Modigliani (1963) model which posits that annual savings is a function of assets, current and expected income, and life expectancy. Munnell uses this model to estimate the determinants of annual savings of employed male heads of households in two separate periods, 1966-1969 and 1969-1971. In these intervals, expected pension benefit levels and expected social security benefit levels are unavailable from the data. To circumvent this problem, Munnell tries two different approaches to the estimation of the impacts of unmeasured expected benefit levels on personal savings. In one model she uses dichotomous dummy variables for the presence or absence of each kind of benefit. In another she assumes that expected private pension benefits are proportional to earnings and that expected social security benefits are proportional to earnings up to a ceiling ($6600 or $7800). Some specifications also included socioeconomic variables such as race, education, attitudes toward inheritance and self-employment as additional explanatory variables. In general, her results show that both private pension coverage and social security coverage reduce personal savings, with the latter, perhaps due to its greater certainty, having the stronger impact.

The impact of private pensions and social security on personal savings is an important public policy issue because private savings adjustments to these kinds of benefits have important implications for the growth of the economy's supply of capital. Munnell's results suggest that while social security has a negative impact on the aggregate supply of capital, private pension plans, on net, do not, since they are savings themselves and substitute for personal savings at more than dollar for dollar. However, her study can easily be replicated using later surveys of the older male cohort, and such a replication would allow for a more rigorous specification of the life cycle savings model. Dummies or proxies for expected benefits would be unnecessary since the 1971 and 1976 surveys of the older male cohort contain questions about expected levels of private and federal retirement benefits as well as questions about levels of reduced benefits if an early retirement option is exercised. Thus it should be interesting to see if Munnell's conclusions are confirmed for later survey years.

We expected to find a greater utilization of the older cohort by social science investigators than we did. While there have been some studies of labor supply and labor demand using surveys of this cohort, the determinants of the retirement decision and the scope of financial planning among these older men are not well-studied. This is somewhat surprising since the surveys of older males contain a wealth of data on the social and psychological aspects of aging as well as detailed income and asset data. Given that older cohorts are a significant and increasing percentage of our population and that this relative growth is raising many policy issues relating to mandatory retirement and income security, we expect that non-CHRR researchers will make greater use of these data sets in the future.

VIII. METHODOLOGICAL RESEARCH USING NLS DATA

NLS data have been used in the exposition of recently developed techniques for assessing the effects of subsample selectiviy bias in estimating models of labor market processes. A problem encountered in the estimation of labor supply and wage equations for women is that no wage is observed for nonworking women. Heckman (1974b, 1976; see also 1974a) develops a procedure that allows estimation of an equation for the probability that a woman works, her labor supply function, (offered) wage function, and asking wage for a woman who does not work. He estimates a model for white, married-spouse present NLS mature women (1967 data) and compares his results to conventional estimates based on the subsample of working women. The latter estimates in the 1974 paper appear to understate the effect of young children on labor supply (asking wage) and also understate the effects of experience and schooling on (offered) wages. The more recent paper corrects results for a coding error in the original analysis and uses some alternative estimation techniques. The wage equation is only minimally affected by sample selectivity, but the supply equation appears to be greatly affected by it. (Cogan (1975) uses the same data to extend the comparison to two other techniques, Tobit and an OLS technique for imputing wages for nonworking women.)

The procedure introduced by Heckman can be generalized to any situation where the probability of subsample selection depends on a parametric function of individual attributes exceeding a threshold value and where the endogenous variable of interest cannot be observed for individuals not in the subsample. Heckman's version of the procedure

involves two steps. First, a probit equation for the probability of selection into the subsample is estimated, and for each observation, a single selectivity bias parameter is estimated. Second, the function for the endogenous variable is estimated with the estimated adjustment parameter included among the right-hand variables.

Fligstein and Wolf (1977) apply Heckman's technique to the same NLS data in order to examine whether accounting for selection into the subpopulation of working women alters the finding that occupational attainment equations of men and women are quite similar. They hypothesize that women who do not work cannot find jobs commensurate with their training and background, and consequently ignoring those women ignores a part of the process of attainment that differs for men and women. However, they find that subsample selection had only minimal effects.

Griliches, Hall, and Hausman (1977) apply Heckman's technique and variations of it to problems of missing data and subsample selection over time in the NLS data for young men. First, they examine whether there is significant nonrandomness in the distribution of missing IQ data among about 35 percent of the cases in 1966. Their first equation represents the likelihood of IQ data present as a function of education, social origins, race, and "knowledge of the world of work." Their second equation represents IQ as a linear function of a similar set of variables. They compare estimates for the IQ equation from OLS on the "good data" subsample with estimates from Heckman's two step procedure and with estimates from direct maximum likelihood estimation of the two equations. The results show little bias due to selection on the "good data" subsample. They then compare coefficients in an earnings function under three alterna-

tives for replacing missing IQ with its predicted value (using OLS, Heckman, and ML prediction estimates). They detect no differences resulting from the way missing data are filled in. Accounting for non-random missing data yields results that differ little from treating the incidence of missing data as random, despite obvious systematic sources of missing IQ information.

Their second application examines bias in a cross-sectional earnings function due to selection into and out of the sample of earners not in school full-time, separately for each year from 1966 to 1971 and for 1973. Their first equation expresses the likelihood of being in the sample as a function of age, schooling, race, ability, father's occupational status, and several control variables. Probit estimates show that in the earlier years, those with more schooling and ability, and younger men, were less likely to be in the sample. Thus, schooling appears to dominate selection out of the sample in earlier years. By 1971 however, schooling, ability, and age have much smaller effects, reflecting the fact that noninterviews and missing data dominate selection out of the sample. Applying Heckman's technique to the wage equation, they find that in the earlier years, 1966 through 1970, selectivity bias in the schooling coefficient is positive, i.e., returns are overstated, while in 1971 and 1973 returns to education are understated when selectivity bias is ignored. They note that their analysis is limited by their dichotimization of "in" versus "out" of the sample when there are in fact qualitatively different reasons for being "out." They suggest incorporating multiple selectivity outcomes into the probit equation as an important area for future elaboration.

Their third application extends the technique to a three equation model designed to eliminate both selectivity and simultaneity bias. Examining the school versus work decision and a wage function for high school graduates in 1973, they note that education cannot be considered predetermined in the wage equation, since years of schooling depends on past and present decisions to work. Their first two equations specify the likelihood of being out of school and years of schooling to be functions of age, military experience, race, social origins, and ability. The wage equation includes schooling, ability, age, race, and several control variables. The simultaneity arises because of a correlation between the disturbances of the schooling and wage equations (and a correlation of each disturbance with that of the "out of school" equation). They compare four sets of estimates of the wage equation: (1) OLS; (2) two equation ML, correcting for selection bias only; (3) 3SLS, correcting for simultaneity bias only; and (4) three equation ML, allowing for both selectivity and simultaneity. The results are striking. Correcting for both sources of bias approximately doubles the return to schooling, increases the return to military experience, and reduces to insignificance the net return to ability. Thus, it appears that naive OLS estimates for wage equations of young men are substantially affected by ignoring those who choose to stay in school or return to school after military experience. Considering the amount of research done on human capital investments of young men and women, these findings on selectivity bias deserve serious study.

Response errors in reports of socioeconomic and labor market characteristics can bias estimates of coefficients for structural equation models. Borus and Nestel (1971, 1973) examine the quality of sons' reports of their fathers' occupational status and educational

attainment for about 1000 father-son pairs that occur in the young men and mature men data due to multiple-respondent households. They find a substantial correlation between reports of fathers and sons, .95 for father's education and .89 for father's occupational status. Estimates for regressions of fathers' reports on sons' reports and demographic characteristics seem to indicate that there may exist some systematic discrepancies between the two reports.[15] However, the findings are of limited utility for two reasons. First, there is no explicit measurement model underlying their statistical analysis. Presumably reports of both fathers and sons may be subject to random and nonrandom response errors, and it is difficult to tell how each of these types of errors affects the regression results. Second, they use the current occupation of the father, while much of the research using the NLS data relies on retrospective reports of parental characteristics when the respondent was 14 years old.

Miller (1977) compares occupational mobility over a five-year period as measured in panel data for the NLS mature men and women with retrospectively measured five-year mobility in the 1970 Census for comparable age groups. Though her analysis is largely descriptive, it seems to show that the patterns of mobility are the same in the panel and retrospective assessments, though the panel data shows the amount of mobility to be considerably greater. She suggests that there may be sources of bias working in opposite directions, random response error at two points in time that yields an overstatement in the panel data, and correlated response error

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[15] Evidence on the quality of "proxy" responses is also presented in Career Thresholds, Vol. 1. It is suggested there that measures of labor force participation and unemployment among youth differ according to whether the information is provided by a household spokesperson (as in the Current Population Survey) or from the youth himself (as in the NLS).

between the concurrent and retrospective report that yields an understatement in mobility in the Census data.

The papers summarized above deal with the quality of measurement in specific variables. Other papers that assess the quality of specific measures are by Kohen and Breinich (1975) on the "knowledge of world of work" items and by Parnes and Spitz (1969b) on the hypothetical job offer items. What we have not seen is any comprehensive review of the reliability of the most important measures and those used most often. Such a report would provide a valuable resource to users of the NLS data.

Another important approach to data quality is to directly incorporate the structure of response error into substantive models. The papers by Chamberlain and Griliches (1974, 1976; also Griliches 1977b) use this approach in two ways. First, they incorporate measured IQ and "knowledge of world of work" into their models as fallible indicators of unobserved latent ability, where each indicator has certain unique relationships to schooling and social origins. Second, by modelling the similarity between brothers, they can account for unmeasured, unobservable aspects of social origins that affect socioeconomic success. This strategy of using multiple measures of latent variables has been underutilized in research using NLS data, especially given the number of variables for which extensive information is obtained from multiple items administered to the same respondent, and the responses obtained for the same items from different persons in multiple-respondent households.

IX. UTILIZATION OF THE NLS DATA

Clearly, the longitudinal nature of the NLS data needs to be more fully exploited. The longitudinal aspect has not been overlooked for lack of appropriate substantive conceptualization; life-cycle and developmental perspectives are central to economic, sociological and psychological theories of individual labor market behavior. Rather we seem to lack (or be unaware of) the appropriate methodologies to analyze panel data. Perhaps we have become too comfortable interpreting cross-sectional differences among individuals as confirmation of longitudinal processes. An obvious example is the interpretation we give to the differences in economic success among individuals with different amounts of labor market experience. Hopefully, the current availability of NLS data with observations at as many as seven points in time, coupled with the increased sophistication of structural equation representations of our theories, will provide the incentive for the application of longitudinal analyses.

Of course, utilization of specific variables depends on the substantive context of the analysis. For example, given the analytically powerful human capital perspective, information on schooling, ability, experience and wages goes a long way. As we have noted above, human capital models have been expanded to incorporate training other than schooling, labor market information, and socioeconomic origins, and they have been empirically tested with NLS data. Similarly, variables relevant to family decision making have been well exploited in studies of household labor supply. Surprisingly though, detailed information quite relevant to

contemporary economic and sociological theories of labor market behavior has been virtually ignored. We have seen no analyses that use the expanded information on health available for all cohorts beginning in 1971, yet physical health (and its change over time) would seem to be a crucial factor in determining the depreciation of human capital. Nor have we seen any analysis of determinants of individual or household demand for health care.

The direct financial costs (as opposed to opportunity costs) of schooling would seem to be quite relevant to human capital and status attainment models of economic success. The nature of human capital often precludes financing investments from usual sources such as banking institutions (since banks cannot repossess human capital). Thus education is often financed out of current family income or assets, and individuals will differ in their ability to finance schooling, especially beyond high school. While this has provided a justification for including social origins in schooling and wage equations, direct information from NLS data for younger cohorts on tuition, financial aid, and source of funds has been overlooked. Unfortunately, data were not collected on the amount of financial assistance from parents, only whether or not they provided any.

Little research using NLS data has been done outside CHRR on aging as a developmental process, despite the longitudinal information on attitudes, assets, health, social security, and pension income. Other items that have received little attention are future job plans (except for

younger women) and the detailed information on financial assets.[16]

The four cohorts were selected because it was anticipated that each would have unique labor market problems in the 1960s and 1970s. While the extensive analyses conducted by the CHRR staff provide insights into the history of the four cohorts, there has been virtually no analysis of the social demography of the four cohorts from the perspective of other researchers. It appears that the social policy concerns that shaped the design of the NLS surveys have failed to motivate other academicians to integrate those concerns with their own research interests. Indeed, many of the neglected content areas seem to reflect the substantive and policy concerns of CHRR as sold to the funding agencies, and vice versa. We agree that these areas have important implications for manpower and other social policy issues. Unfortunately, social scientists working within specific and well-developed research paradigms may not have the insight, incentive, or even abilitiy to incorporate those areas into their own empirical research.

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[16]Furthermore, we have not come across a single analysis of the mature women data that uses the item, collected from 1967 through 1972, whether the family purchased a garbage disposal in the previous year (and whether it was new or used).

X. THE NLS DATA--SOME NEGLECTED CONSIDERATIONS

As noted above, straightforward analysis of issues in labor demand utilizing social survey data on individuals is often difficult. This certainly applies to the NLS data. Information on job characteristics and the work setting is required in order to examine how individuals get access to jobs and then move up within firm job ladders and authority hierarchies. While explicating just what data should be obtained from individuals is problematic, the NLS data does seem particularly deficient in certain respects. Longitudinal data on promotions, supervisory responsibilities, job autonomy, and decision-making capacities would certainly render some predictions of dual or segmented labor market theory empirically testable. Furthermore, such data might allow an empirical assessment of the degree to which occupational segregation by sex is attributable to individual occupational choice as opposed to employer and/or employee decisions.

Even in research areas that are well-defined and adequately covered by the NLS, some questionnaire items are at variance with corresponding substantive concepts. A particularly important example is the assessment of labor market experience. General labor market experience prior to the initial survey is assessed only for the cohort of mature women, and that measure has some undesirable properties. Respondents reported the number of years in which they worked at least six-months. If total weeks of experience is the appropriate indicator, then the NLS item will tend to have errors that are positively correlated with true experience. For

example, women who consistently work between 27 and 51 weeks will have their experience overstated (since they will be atributed a full year of experience), while those who consistently work between 1 and 25 weeks per year will have theirs understated (since they will be attributed zero weeks of experience). Although the implications are not as serious, the measure of employer-specific experience (job tenure) of first job after completing schooling for mature women is measured differently according to marital status and presence of children, and is measured differently from that obtained for the other three cohorts.[17]

Several measures of social origins might have been better assessed had they been asked differently. Occupation of father (or head of household) when respondent was 14 or 15 years old was assessed with the single item: "What kind of work was your father doing . . ." instead of the standard five-part Census item. Further, occupation and education of respondent's mother was not assessed at all for mature men.

While it has been neglected in the past, it is encouraging to see that both the designers and users of the NLS are becoming increasingly sensitive to problems of sample selection bias. It is our understanding that screening for the new NLS cohorts may attempt to identify males that were omitted from the original youth sample because they were not in the civilian noninstitutional population, who were, for example, in the military. Yet it is surprising that so little attention has been paid to the impact

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[17]For young men and women and mature men, tenure at first job is for the first job after schooling that was held for at least one month. For never-married mature women with no children it is first job held at least six months. For ever-married mature women and never-married mature women with children, it is not assessed.

of the Vietnam war on the younger male cohort. Kohen and Shields (1977) are the only researchers who have investigated the determinants of participation in the military. More important to general research considerations, however, is the impact of the war on the labor market behavior of those who remained in the civilian population. It can be expected that those who faced the likelihood of compulsory future military service exhibited a different rate of time preference from those who did not. The behavior of each group with respect to schooling, on-the-job training, and other labor market choices should reflect this difference. Of those researchers using the data on the younger men, Olson (1976a) and Madden (forthcoming) are the only investigators who have taken this point into explicit consideration.

XI. FUTURE RESEARCH WITH THE NLS

What will be the research issues of the 1980s? There are two related aspects to the answer: substantive issues and policy issues. One of the most important substantive issues for the 1980s, in our view, is the family. Research addressing the developing social forces affecting the family requires a greater understanding of its internal decision-making processes with respect to labor supply, allocation of resources, composition and dissolution. Related policy issues are public assistance, child care, and educational policy.

Another important substantive issue is institutional constraints on the demand for labor. Occupational segregation and labor market discrimination by race and sex, and the matching of individuals to jobs are still only vaguely understood by social scientists. Related policy issues are affirmative action, corporate promotion policies, unemployment, and the creation of public sector jobs.

Underlying the issues noted above are the social demography of successive cohorts over time, technological change, and the institutional responses to these developments. The National Longitudinal Surveys of labor market experience provide vital information on all of these issues, as shown in this review of research based largely on just the first five years of panel data.

It would be presumptuous of us to prescribe the research that our colleagues should undertake in the next decade. However, we have tried to provide some coherence to an extensive body of research, and we would hope that the unifying themes be kept in mind as each of us goes on to pursue

his or her next technical report. Finally, we would like to see social scientists give greater consideration to adopting the NLS in their empirical research. Data processing problems of CHRR and the Census Bureau that were characteristic of the early stages of the surveys seem to have been overcome. Those problems have contributed to a reluctance of many social scientists to utilize the NLS data. It is our impression that past data processing problems have given the NLS an undeserved "bad rap" among many sociologists and economists. We hope this report contributes to alleviating that reputation.

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